ENGLISH

FRANÇAIS

ESPAÑOL

ADEMCO VIDEO

HIGH DENSITY REALTIME VIDEO CASSETTE RECORDER

AVR960SV

Instruction manual
To obtain the best performance and ensure years of trouble-free use, please read this instruction manual completely.

Mode d'emploi
Des performances optimales et un fonctionnement à long terme seront assurés en appliquant les présentes instructions après avoir entièrement lu ce mode d'emploi.

Manual de instrucciones
Para obtener el mejor funcionamiento y asegurar años de uso libre de problems, lea cuidadosamente este manual de instrucciones.

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FEATURES

Recording

- S-VHS Time Lapse Video Recorder
- Two Recording Modes — Normal Mode and HD (High Density) Mode
- Horizontal resolution of 400 lines or more
- Thirteen Touch-Selectable Recording Speeds
- Automatic "Alarm-Command" Speed up
- Recording Check
- One Shot Recording
- On-Screen and On-Tape Time/Date Information
- 7-Day Programmable On/Off Timer
- "Alarm On" Output
- Usable Audio at 02, A12 and A24 Hour Speeds in the Normal Mode and at 06, A18 and A30 Hour Speeds in the HD Mode
- RS-232C Interface Connector

Playback

- Time Date Search
- Time-of-Alarm Memory and Alarm Index Search
- High Speed Visual Search
- Fourteen Playback Speeds
- Still Field, Field-Advance, Field-Reverse and Reverse Playback

Security

- About 720 Hours Memory Protection
- Electronic Security Lockout

Note: This recorder has a rechargeable battery to maintain display functions and recording mode within 720 hours in the event of power loss. When the recorder is received, the unit must be connected to power source for 48 hours to assure the battery has been adequately charged.

Note: Videocassettes other than those marked S-VHS or VHS cannot be used in this recorder.

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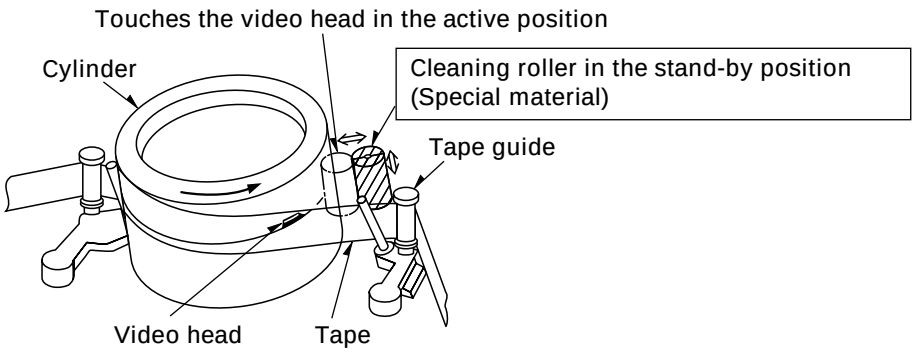
Auto Head Cleaning System

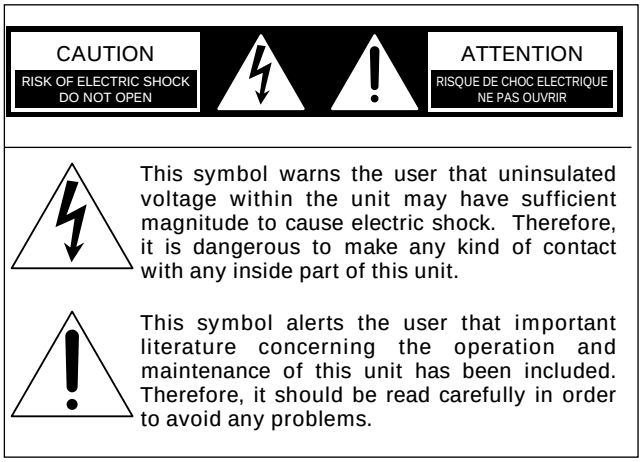
This system cleans the video heads automatically when a cassette is inserted and ejected or the tape is rewound in the recycle recording mode, to prevent dirt from accumulating on the heads.



FOR YOUR SAFETY

Power supply: AC 120V, 60 Hz only
If the unit is to be left unattended for a log period and it is not intended to use the unit, it is recommended that the unit be completely switched off by removing the plug.

Illustrated below is molded on the back of your unit.



This symbol warns the user that uninsulated voltage within the unit may have sufficient magnitude to cause electric shock. Therefore, it is dangerous to make any kind of contact with any inside part of this unit.

This symbol alerts the user that important literature concerning the operation and maintenance of this unit has been included. Therefore, it should be read carefully in order to avoid any problems.

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK).
NO USER–SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

WARNING: TO PREVENT FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

Warning: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.
Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CAUTION: CHANGES OR MODIFICATIONS NOT EXPRESSLY APPROVED BY THE PARTY RESPONSIBLE FOR COMPLIANCE COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the Interference-causing equipment standard entitled "Digital Apparatus", ICES-003 of the Department of Communications.

PRECAUTIONS

Safety
- Should any solid object or liquid fall into the cabinet, turn off the unit and have it checked by qualified personnel before operating it any further.
- To disconnect the power cord, pull it out by the plug. Never pull the cord itself.

Installation
- Choose a location in which air can pass through the ventilation holes in the bottom, top and back of the unit to prevent it from overheating.
- Do not install the unit near heat sources such as radiators or air ducts or in a place subject to direct sunlight, excessive dust, mechanical vibrations or shock.
- Do not place heavy objects or heat-generating objects on the VCR, or the cabinet could be damaged or the temperature inside the VCR could rise, which could cause a fault.
- Never bring a magnet or magnetized object near the VCR because it will adversely affect the performance of the VCR.
- Do not install the unit in an inclined position. The unit is designed for operation in a horizontal position.

Operation
- Condensation
  If you pour a cold liquid into a glass, water vapor in the air will condense on the surface of the glass.
  This is the condensation of moisture.
  Condensation on the head drum, one of the most crucial parts of the VCR, will cause damage to the tape.The VCR should not be operated for at least 2 hours after being moved from a cold to a hot environment to avoid condensation from occurring on the head drum.

Cleaning
- Be careful; when the surface of the case is wiped with a volatile agent such as benzine, alcohol, thinner, etc., or a chemically processed cloth, the surface finish may be degraded or its coating may peel off.

Repacking
- It is wise to save the packing materials and box in case you ever need to ship or store your unit.

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IMPORTANT SAFEGUARDS

In addition to the careful attention devoted to quality standards in the manufacture of your video product, safety is a major factor in the design of every instrument. But, safety is your responsibility too.

These pages list important information that will help to assure your enjoyment and proper use of a Video Cassette Recorder and accessory equipment. Please read it carefully before operating your video product and keep it in a handy place for future reference.

INSTALLATION

1 **Read and Follow Instructions—**All the safety and operating instructions should be read before the video product is operated. Follow all operating and use instructions.

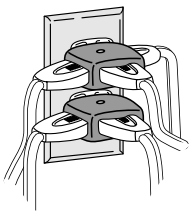
2 **Retain Instructions—**The safety and operating instructions should be retained for future reference.

3 **Head Warnings—**Comply with all warnings on the video product and in the operating instructions.

4 **Grounding or Polarization—**This video product is equipped with a 3-wire grounding-type plug, a plug having a third (grounding) pin. This plug will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the grounding-type plug.

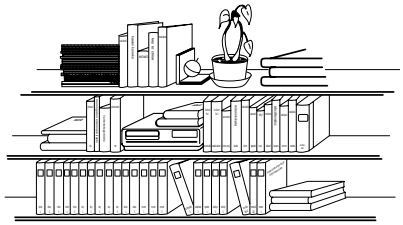
5 **Power Sources—**This video product should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply to your home, consult your video dealer or local power company. For video products intended to operate from battery power, or other sources, refer to the operating instructions.

6 **Overloading—**Do not overload wall outlets and extension cords as this can result in a risk of fire or electric shock. Overloaded AC outlets and extension cords are dangerous, and so are frayed power cords, damaged or cracked wire insulation and broken plugs. They may result in a shock or fire hazard. Periodically examine the cord and have it replaced by your service technician if appearance indicates damage or deteriorated insulation.



7 **Power-Cord Protection—**Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.

8 **Ventilation—**Slots and openings in the cabinet are provided for ventilation to ensure reliable operation of the video product and to protect it from overheating. These openings must not be blocked or covered. The openings should never be blocked by placing the video product on a bed, sofa, rug, or other similar surface. This video product should never be placed near or over a radiator or heat register. This video product should not be placed in a built-in installation such as a bookcase or rack unless proper ventilation is provided or the video product manufacturer's instructions have been followed.



9 **Attachments—**Do not use attachments unless recommended by the video product manufacturer as they may cause hazards.

Caution: Maintain electrical safety. Powerline operated equipment or accessories connected to this unit should bear the UL listing mark or CSA certification mark on the accessory itself and should not have been modified so as to defeat the safety features. This will help avoid any potential hazard from electric shock or fire. If in doubt, contact qualified service personnel.

10 **Water and Moisture—**Do not use this video product near water—for example, near a bath tub, wash bowl, kitchen sink, or laundry tub, in a wet basement, or near a swimming pool, and the like.

11 **Accessories—**Do not place this video product on an unstable cart, stand, tripod, bracket, or table. The video product may fall, causing serious injury to a child or adult, and serious damage to the appliance. Use only with a cart, stand, tripod, bracket, or table recommended by the manufacturer, or sold with the video product. Any mounting of the product should follow the manufacturer's instructions, and should use a mounting accessory recommended by the manufacturer.

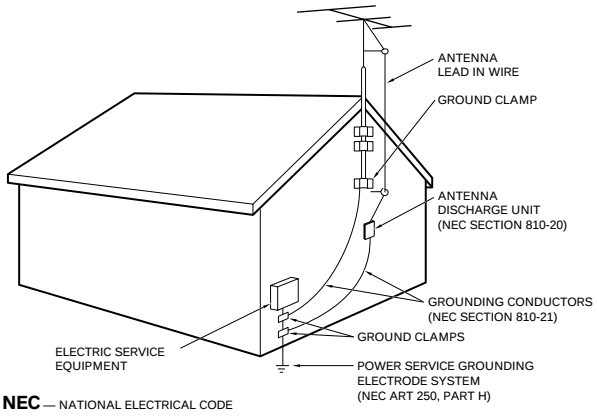
11A An appliance and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn.

S3125A

(Continued on other side)

12 **Outdoor Antenna Grounding—**If an outside antenna or cable system is connected to the video product, be sure the antenna or cable system is grounded so as to provide some protection against voltage surges and built-up static charges. Section 810 of the National Electrical Code, ANSI/NFPA No. 70, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna-discharge unit, connection to grounding electrodes, and requirements for the grounding electrode. See example below.

EXAMPLE OF ANTENNA GROUNDING



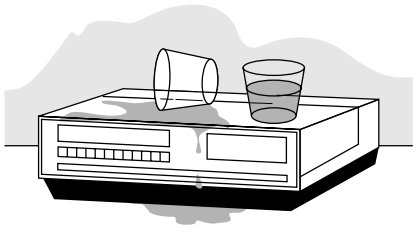
NEC — NATIONAL ELECTRICAL CODE

13 **Power Lines—**An outside antenna system should not be located in the vicinity of overhead power lines or other electric light or power circuits, or where it can fall into such power lines or circuits. When installing an outside antenna system, extreme care should be taken to keep from touching or approaching such power lines or circuits as contact with them might be fatal. Installing an outdoor antenna can be hazardous and should be left to a professional antenna installer.

USE

14 **Cleaning—**Unplug this video product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.

15 **Object and Liquid Entry—**Never push objects of any kind into this video product through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind on the video product.



16 **Lightning—**For added protection for this video product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the antenna or cable-system. This will prevent damage to the video product due to lightning and power-line surges.

SERVICE

17 **Servicing—**Do not attempt to service this video product yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.

18 **Conditions Requiring Service—**Unplug this video product from the wall outlet and refer servicing to qualified service personnel under the following conditions.

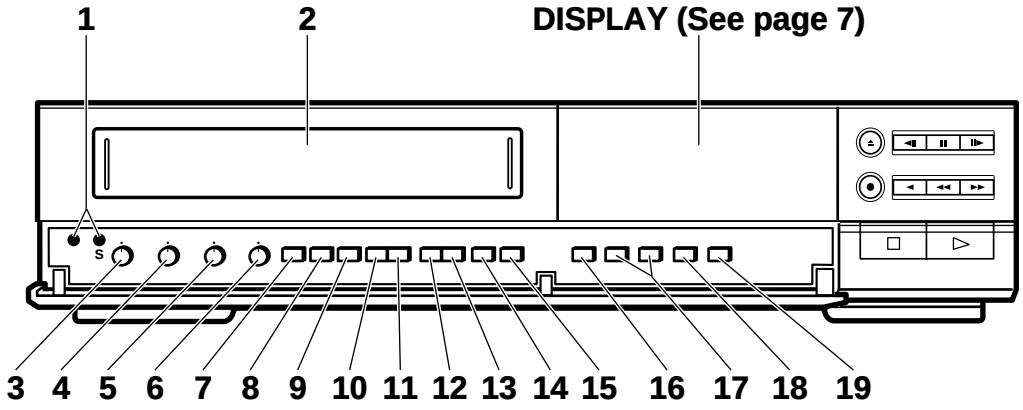
a. When the power-supply cord or plug is damaged.
b. If liquid has been spilled, or objects have fallen into the video product.
c. If the video product has been exposed to rain or water.
d. If the video product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions. Improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the video product to its normal operation.
e. If the video product has been dropped or the cabinet has been damaged.
f. When the video product exhibits a distinct change in performance — this indicates a need for service.

19 **Replacement Parts—**When replacement parts are required, have the service technician verify that the replacements he uses have the same safety characteristics as the original parts. Use of replacements specified by the video product manufacturer can prevent fire, electric shock or other hazards.

20 **Safety Check—**Upon completion of any service or repairs to this video product, ask the service technician to perform safety checks recommended by the manufacturer to determine that the video product is in safe operating condition.

CONTROLS AND FUNCTIONS

[FRONT]



1. RESET BUTTONS
Press these buttons at the same time to clear all (microprocessor) functions.
Press the "S" button to reset the system. (This does not erase the stored information.)

2. CASSETTE COMPARTMENT

3. SHARPNESS CONTROL
Adjust the picture quality to hard or soft during playback.

4. TRACKING CONTROL
Adjust to optimize the picture quality during playback at the 02, A12 and A24 hour speeds in the NORMAL mode and at the 06, A18 and A30 hour speeds in the HD mode.

5. SLOW TRACKING CONTROL
Adjust to optimize the picture quality in the SLOW PLAY mode, e.g. speeds over 24 hours in the NORMAL mode and over 30 hours in the HD mode.

6. V. LOCK CONTROL
Reduces vertical jitter in the still play mode.

7. PROGRAM BUTTON
Press to select one of the seven programmable functions.

8. START/STOP BUTTON
Press to start or stop the programming of a programmable function. (Press once to start the programming sequence and a second time to stop (end) it.)

9. SET BUTTON
Press to select the specific value which is to be changed with the UP/DOWN buttons.

10. DOWN BUTTON
Press to decrement, change or reverse to the previous/lower value.

11. UP BUTTON
Press to increase, change or advance to the next higher value.

12. V-POS (VERTICAL POSITION) BUTTON
Press repeatedly to control the vertical position of the programmable display on the monitor.

13. H-POS (HORIZONTAL POSITION) BUTTON
Press repeatedly to control the horizontal position of the programmable display on the monitor.

14. ALARM INDEX BUTTON
Press this button to cause the INDEX indicator to light, and set the VCR to the visual search mode (press F.FWD or REWIND during playback mode) in this state; the start of the alarm recorded can be located.

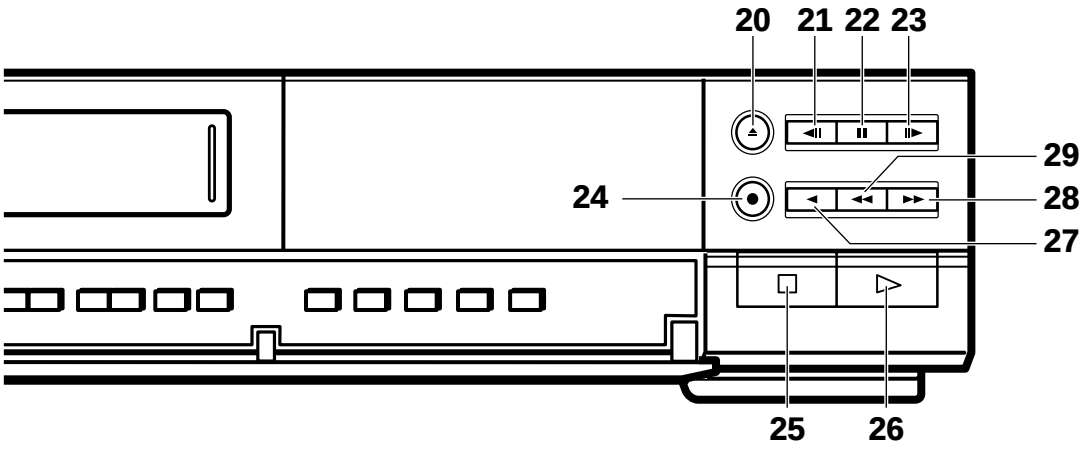
15. ALARM RESET BUTTON
Press to clear POWER LOSS information. When this button is pressed, the alarm memory is cleared.

16. COUNTER RESET BUTTON
Press to clear the digital counter to "00000".

17. REC/PLAY HOURS BUTTONS
▲ (UP): Press to increase hours to the next higher value.
▼ (DOWN): Press to decrease hours to the next lower value. The tape speed will be indicated as part of the monitor display.

18. TIMER BUTTON
Press after programming the TIMER for automatic TIMER recording. See page 18 for TIMER programming.

19. TIME DATE SEARCH BUTTON
Press to start indexing the time/date data of a cassette recorded in the TIME DATE SEARCH mode.



20. EJECT BUTTON
Press to remove the cassette. The EJECT button will not operate in the RECORD mode.

21. FIELD REVERSE BUTTON
Press to reverse the tape by one field in the STILL playback mode.

22. STILL BUTTON
Press to momentarily stop tape motion in the play mode. The STILL function allows close inspection of individual scenes. See the description of STILL playback on page 25.

23. FIELD FORWARD BUTTON
Press to advance the tape one field in the STILL playback mode.

24. RECORD BUTTON
Press to start recording.

25. STOP BUTTON
Press to stop the tape. The STOP button must be pressed to end the RECORD and PLAY mode.

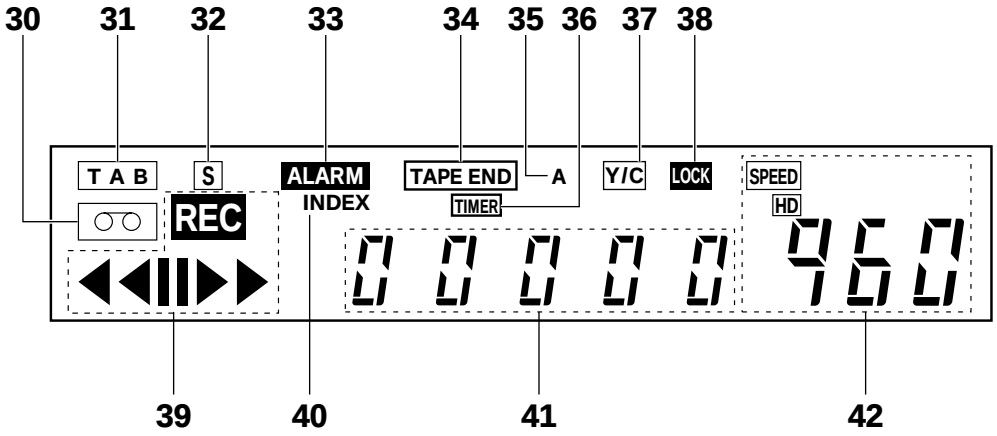
26. PLAY BUTTON
Press to play recorded material in the forward direction. Pressing this during recording makes it possible to check recordings.

27. REVERSE PLAY BUTTON
Press to play recorded material at the 02, 72, 120, 168, 240, 360, 480, 600, 720 or 960 speed (06, 72, 120, 168, 240, 360, 480, 600, 720 or 960 speed) in the reverse direction during the NORMAL (HD) mode.

28. FAST FORWARD/VISUAL SEARCH BUTTON
Press to activate fast forward.
Press this button during playback and a forward playback picture at high speed can be seen.

29. REWIND/VISUAL SEARCH BUTTON
Press to start rewind.
Press this button during playback and a reverse playback picture at high speed can be seen.

[DISPLAY]



30. TAPE-IN INDICATOR
Lights when a cassette is in the compartment.

31. TAB INDICATOR
Lights when a cassette without its safety tab is loaded.

32. S INDICATOR
This is always lit, but goes out when a VHS tape is inserted and playback is done with "PLAY MODE: VHS" specified on the SELECTION MENU Ⅰ screen.

33. ALARM INDICATOR
ALARM appears during alarm recording.
ALARM flashes when alarm recording ends.

34. TAPE END INDICATOR
Lights when the tape reaches the end during recording.
Note: "TAPE END" is not displayed when you have selected REW, RE-REC in the "RECYCLE FUNCTIONS" menu in the alarm display or you have selected REWIND, STOP IF ALARM but an alarm recording has not been made.

35. A INDICATOR
Lights when no video signal is input. Video signal input will turn this indicator off automatically.

36. TIMER INDICATOR
This is lit during timer recording or TIMER stand-by mode.
The indicator flashes in the following cases.
- A cassette is not loaded.
- A cassette without its safety tab is loaded.
- The timer has not been programmed.

37. Y/C INDICATOR
Y/C will light when "VIDEO INPUT: Y/C" is specified in SELECTION MENU Ⅰ.

38. LOCK INDICATOR
LOCK appears when the recorder is in the security lock mode.

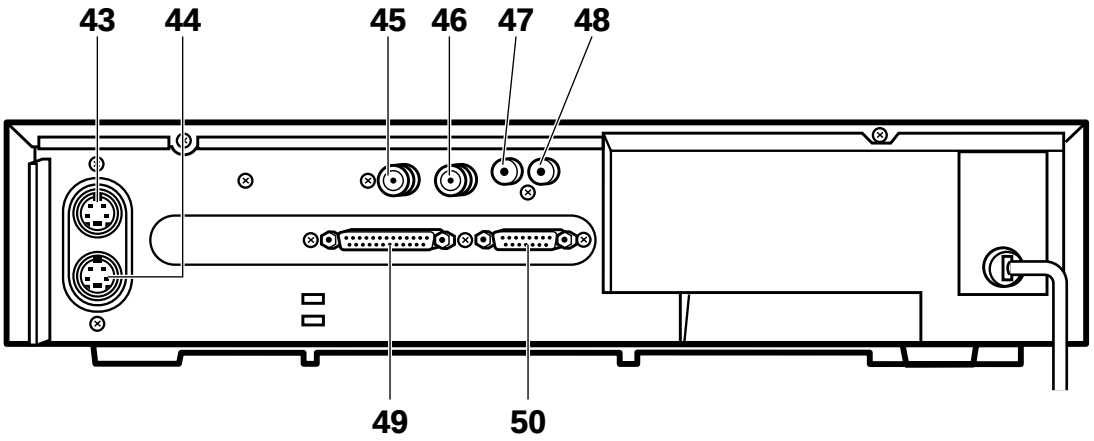
39. VCR MODE INDICATORS
- REC appears during recording.
- ◀◀ appears during the rewind mode.
- ▶▶ appears during the fast forward mode.
- ◀◀ (or ▶▶) flashes during visual search.
- ▶ appears during the playback mode.
- ◀ appears during the reverse play mode.
- ⏸ appears when the STILL button is pressed during play mode and disappears when the STILL or PLAY button is pressed again.
- ◀⏸ (or ⏸▶) appears while the FIELD REV (or FIELD FWD) is held depressed in the still playback mode.
  Note: Still playback is restored when the FIELD REV (or FIELD FWD) button is released.

40. INDEX INDICATOR
INDEX appears when the ALARM INDEX button is pressed.
INDEX disappears when the ALARM INDEX button is pressed again.
INDEX flashes during alarm indexing.

41. DIGITAL COUNTER
Shows the tape counter. The counter does not count during non-recorded sections of a tape.

42. TAPE SPEED INDICATOR
Shows the tape speed. "HD" is displayed in the HD mode.

[REAR]



43. Y/C (S) IN
Receives Y/C (S) video signal from a video camera or another VCR.

44. Y/C (S) OUT
For connection to monitor.

45. VIDEO IN
Receives video signal from a video camera or another VCR.

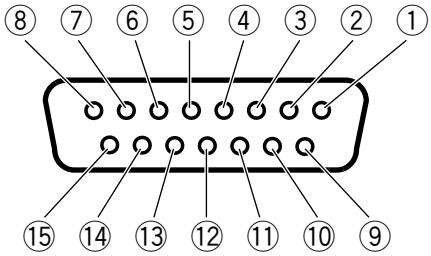
46. VIDEO OUT
For connection to monitor.

47. AUDIO IN
Accepts an audio signal from a camera, external sound equipment or another recorder (Line: –8 dBm, 50 Kohm, unbalanced).

48. AUDIO OUT
Provides an audio output for a monitor or another recorder (–9 dBm, 600 ohm, unbalanced).

49. RS-232C INTERFACE (D-SUB25) JACK
Used to operate this VCR from a personal computer.

50. EXTERNAL INTERFACE (15-PIN) JACK
Connect an alarm switch, door sensor, etc. using the 15-pin adapter provided.



① ALARM IN
② ALARM OUT
③ ONE SHOT IN
④ TAPE END OUT
⑤ TAPE END RESET
⑥ WARNING OUT
⑦ –
⑧ TIME ADJUST
⑨ CAMERA SW OUT
⑩ REC START IN
⑪ –
⑫ –
⑬ REMOTE IN
⑭ REC CHECK IN
⑮ GND

INSTALLATION

VIDEO CONNECTIONS

Use coaxial cables when connecting a camera and a monitor to this VCR.

Note: Long cable runs to distant cameras may cause signal deterioration and/or sync discrepancies. If these problems occur, use video line amplifiers and/or cameras having phase-adjustable line-locked vertical sync.

Video Input

In single camera systems, connect the camera to the Video IN BNC terminal on the VCR rear panel. Use of a 2:1 interlace camera is highly recommended; otherwise, the monitor will show vertical distortion of the TIME/DATE characters.

In multiple camera systems, connect the switcher output to the Video IN BNC terminal. Because multiple camera systems require synchronization, use of cameras having line-locked vertical sync or a genlocked master drive/sync source is highly recommended. The use of vertical interval switchers is also recommended.

Video Output

Connect the monitor to the Video OUT BNC terminal on the rear panel.

AUDIO CONNECTIONS

Note: Audio recording can be performed at the 02, 12 and 24-hour (06, 18 and 30-hour) recording speeds and audio playback at the 02, A12, and A24 (06, A18 and A30) speeds in the NORMAL (HD) mode.

Audio In: Accepts an audio signal from a camera, external sound equipment, or another recorder (Line: –8 dBm, 50 kohm).

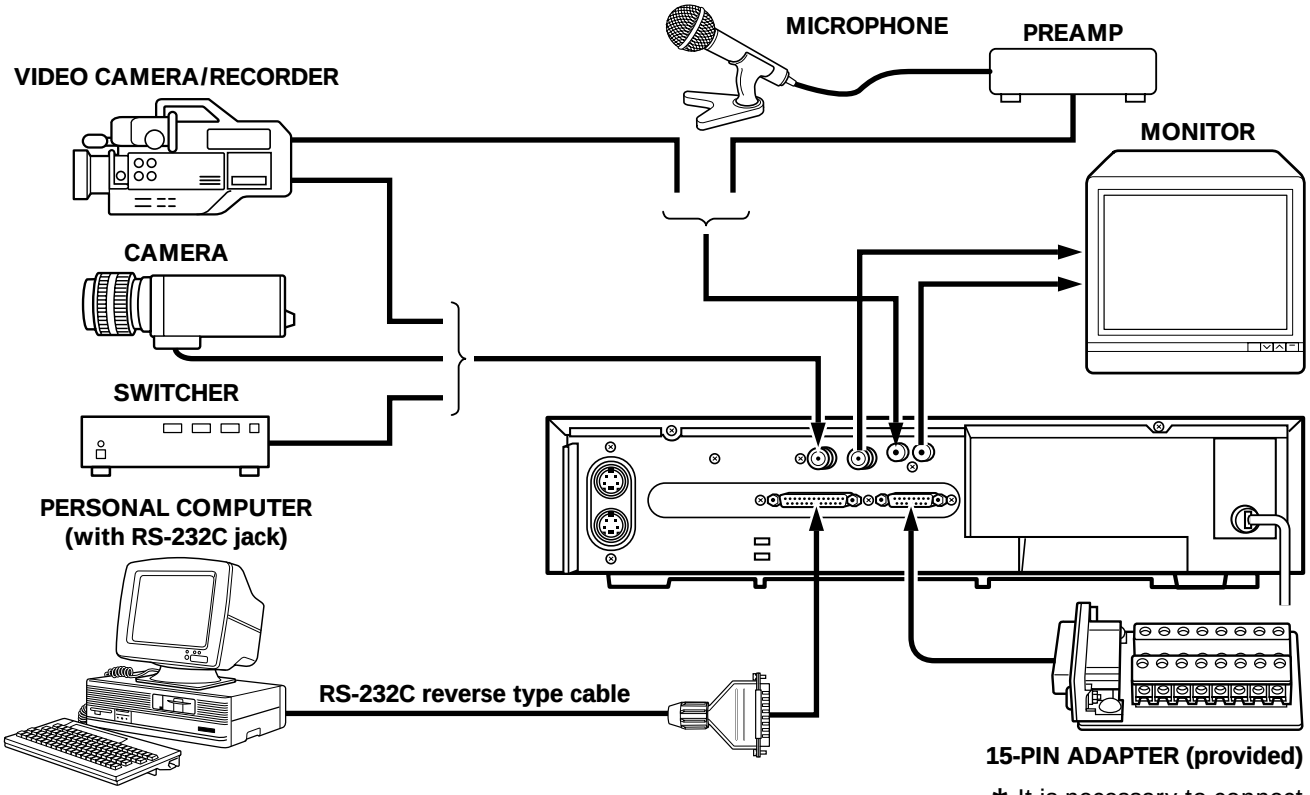
Audio Out: Provides an audio output for a monitor or another recorder (–9 dBm, 600 ohm, unbalanced).

USING THE 15-PIN ADAPTER

Attach the wires of the alarm switch, door sensor or warning lamp to the 15-pin adapter using screws.

After connection, connect the adapter to the EXTERNAL INTERFACE jack on the rear of the VCR.

See pages 11 and 12 for details.



* It is necessary to connect to suit your purpose.

Functions of RS-232C Connector Pins

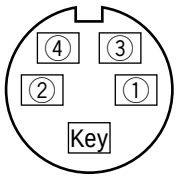
1. Ground	2. Data transmission
3. Data reception	4. Connected to pin 5.
5. Connected to pin 4.	6. Connected to pin 20.
7. Ground	8 ~ 19 and 21 ~ 25. Not connected.
20. Connected to pin 6.	

Refer to page 10 when connecting a component with an S connector.

Y/C (S) VIDEO CONNECTION

Use S-connector cables when connecting a camera and a monitor to this VCR.

Note: Long cable runs to distant cameras may cause signal deterioration and/or sync discrepancies. If these problems occur, use video line amplifiers and/or cameras having phase-adjustable line-locked vertical sync.



Y/C (S) Connectors

Pin No.	Function
①	Y Ground
②	C Ground
③	Y Signal
④	C Signal

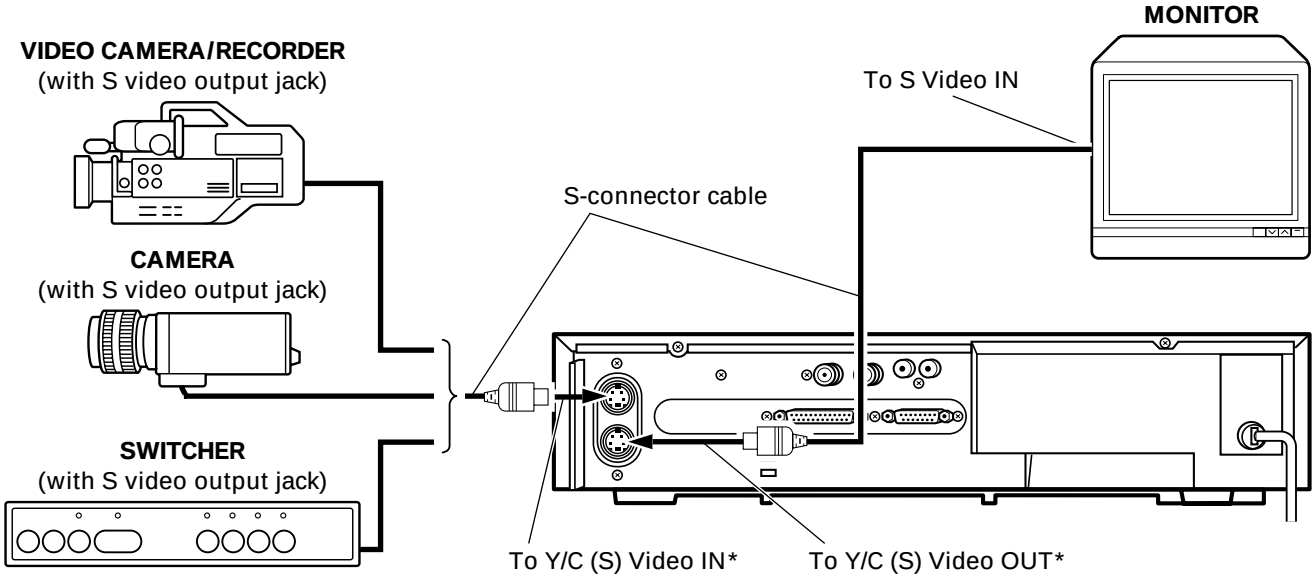
Y/C (S) Video Input

In single camera systems, connect the camera to the Y/C (S) Video IN terminal on the VCR rear panel. Use of a 2:1 interlace camera is highly recommended; otherwise, the monitor will show vertical distortion of the TIME/DATE characters.

In multiple camera systems, connect the switcher output to the Y/C (S) Video IN terminal. Because multiple camera systems require synchronization, use of cameras having line-locked vertical sync or a genlocked master drive/sync source is highly recommended. The use of vertical interval switchers is also recommended.

Y/C (S) Video Output

Connect the monitor to the Y/C (S) Video OUT terminal on the rear panel.

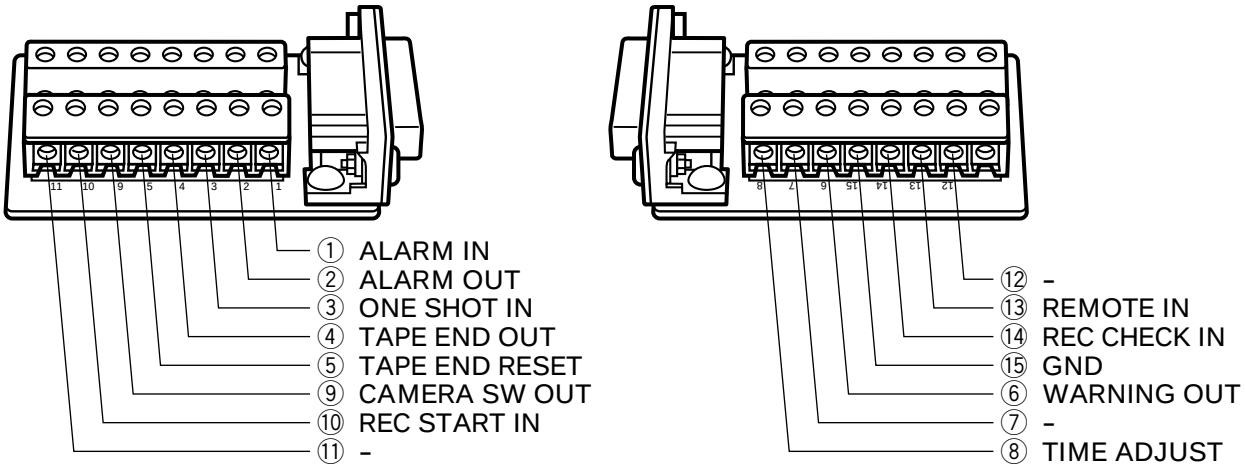


* The Y/C (S) Video IN and OUT terminals on this VCR are of the screw-in type, but normal plug-in type plugs can also be connected.

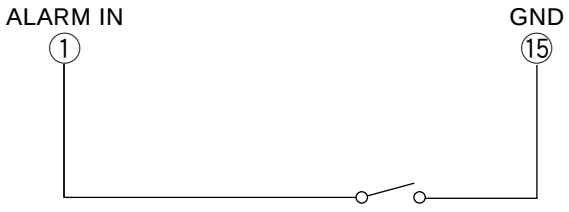
To record the video signal using the Y/C (S) VIDEO IN jack, specify "VIDEO INPUT: Y/C" on the SELECTION MENU Ⅰ screen. (See page 20)

EXTERNAL CONNECTIONS

Pin Arrangement of 15-Pin Adapter



ALARM IN
You can connect two devices including an alarm switch with a resistance of 1 kohm or less or a door sensor. Connect pin ① to pin ⑮ (ground) through the switches.



ALARM OUT
Approx. 12V is applied to pin ② during an alarm recording.
Notes:
- When you have selected "PULSE" in the "ALARM OUT" menu in the ALARM display, approx. 12V pulses will be applied to the output after the alarm recording ends.
- When you have selected "DURATION" in the "ALARM OUT" menu in the ALARM display, no voltage is applied after the alarm recording ends.
- The output impedance is approx. 100 ohm.

ONE SHOT IN
One shot recording is possible when pin ③ is shorted to pin ⑮.
Note: Do not apply a voltage to pin ③ or ⑮.

TAPE END OUT
Approx. 12V is applied to pin ④ when the tape reaches the end.
Notes:
- This does not operate when you have selected "REW, RE-REC" in the "RECYCLE FUNCTIONS" menu in the ALARM display or you have selected "REWIND, STOP IF ALARM" and no alarm recording has been made.
- The output impedance is approx. 100 ohm.

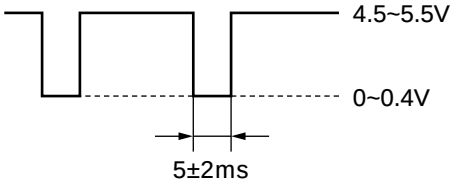
TAPE END RESET
The TAPE END OUT function can be turned off when pin ⑤ is shorted to pin ⑮.
Note: Do not apply a voltage to pin ⑤ or ⑮.

WARNING OUT
When an abnormality has occurred in this VCR, approx. 5V is output to pin ⑥ to warn the user.

TIME ADJUST
When two or more of this VCR model are used, connect via pins ⑧. With only one VCR, specify TIME ADJUST: MASTER, in [OPTIONS] items on the CLOCK SET display. Specify TIME ADJUST: SLAVE (default setting at the factory) for all other VCRs. Each time "2:00:05" is reached, the VCR set to MASTER transmits pulses for adjustment to the VCRs set to SLAVE. When the VCRs set to SLAVE receive these pulses, their clocks will adjust to the same time as the clock in the VCR set to MASTER.

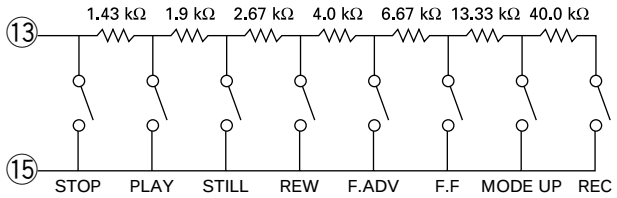
Note: Be sure to set only one VCR to MASTER. If no VCR is set to MASTER, or two or more VCRs are set to MASTER, the TIME ADJUST function will not operate normally.

CAMERA SW OUT
Pin ⑨ outputs the following signal each time a one-field image is recorded. You can combine this with a video camera switcher which can be controlled externally.
The output timing can be specified using the SELECTION MENU Ⅰ screen.



REC START IN
Recording is started when 5-12V is applied to pin ⑩.

REMOTE IN
This VCR can be remote controlled when the following circuit is connected to pin ⑬.



Use the above resistance values ±2%.

REC CHECK IN
Recording can be checked when pin ⑭ is shorted to pin ⑮ during recording mode. The recorded material is played back for several seconds so that you can check whether recording is made normally or not.

CASSETTE TAPES

Videocassettes other than those marked S-VHS or VHS cannot be used in this VCR.
It is recommended that you use standard grade VHS video tapes of the following makers:

Maxell TDK Fuji

TAPE LIFE

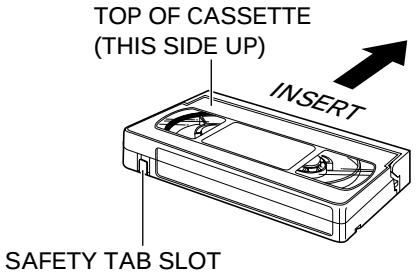
Slower speed operation in time lapse recording applies stress to video tape. Tapes should be inspected and, if necessary, discarded after the total number of complete tape passes (recording and playback) exceeds the following limits:

Tape Speed	Complete Tape Passes
02, 06*, 12, 18*, 24, 30*	50
48, 72, 120, 168, 240	25
360, 480, 600	10
720, 960	5
00	2

*: HD mode

INSERTING A CASSETTE

Note: This is the first step in all VCR operations. The VCR will not operate without a cassette in place.
To insert a cassette push the cassette through the cassette compartment door until the VCR mechanism pulls it into the compartment.
The tape-in indicator turns on.



Tape Insertion Position

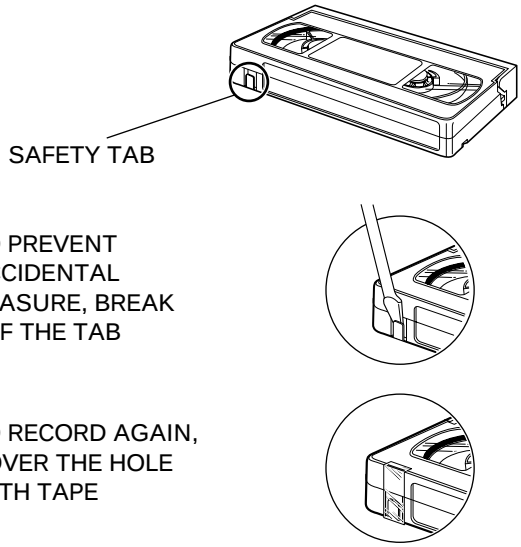
REMOVING A CASSETTE

Before removing a cassette: rewind the tape completely.
To remove a cassette, press the EJECT button. The cassette will come partially out of the compartment so you can pull it out.

VIDEO CASSETTE SAFETY TAB

To prevent accidental erasure of recorded material, remove the safety tab from the lower left corner of the cassette.
Recording is impossible when the safety tab is removed.
Notes:

- The TAB indicator lights when a cassette without its safety tab is loaded.
- To record again on a cassette that has its safety tab removed, cover the tab hole with tape. In the TIMER mode, the TIMER indicator will flash on and off if the cassette is inserted without its safety tab slot covered or intact.



Video Cassette Safety Tab

TAPE LENGTH

The total recording time at each of the thirteen tape speeds depends on the length of the tape used.
The table below shows:

1. The total recording time that can be recorded at each tape speed mode on T60 and T120 tapes.
2. The pictures per second at each speed.
3. The speeds at which audio can also be recorded.

Use the table to select the tape length which gives the best compromise between tape cost, total recording time, and elapsed time between pictures.

NORMAL MODE

Tape Speed Mode		00	02	12	24	48	72	120	168	240	360	480	600	720	960
Total Recording Hours	T60	—	1	6	12	24	35	60	84	120	180	240	300	360	480
	T120	—	2	12	24	48	72	120	168	240	360	480	600	720	960
Pictures/ Second	RECORD	2.2	60	8.6	4.6	2.2	1.5	0.92	0.66	0.47	0.3	0.24	0.18	0.15	0.12
	PLAYBACK	—	60	8.6	4.6	2.2	1.5	0.92	0.66	0.47	0.3	0.24	0.18	0.15	0.12
Audio	RECORD	No	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No
	PLAYBACK	No	Yes	Yes(A12)	Yes(A24)	No	No	No	No	No	No	No	No	No	No

Note: The values in this table are approximate.

HD MODE

Tape Speed Mode		00	06	18	30	48	72	120	168	240	360	480	600	720	960
Total Recording Hours	T60	—	3	9	15	24	36	60	84	120	180	240	300	360	480
	T120	—	6	18	30	48	72	120	168	240	360	480	600	720	960
Pictures/ Second	RECORD	6.67	60	20	12	6.67	4.61	2.86	2.07	1.33	0.92	0.72	0.55	0.45	0.12
	PLAYBACK	—	60	20	12	6.67	4.61	2.86	2.07	1.33	0.92	0.72	0.55	0.45	0.12
Audio	RECORD	No	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No
	PLAYBACK	No	Yes	Yes(A18)	Yes(A30)	No	No	No	No	No	No	No	No	No	No

Note: The values in this table are approximate.

SETUP

On-Screen displays are provided to aid setup of the programmable functions. The seven functions on the Program Menu appear individually on the monitor in this order.

1. TIME/DATE
2. CLOCK SET
3. TIMER
4. SELECTION MENU Ⅰ
5. SELECTION MENU Ⅱ
6. ALARM
7. ALARM MEMORY

TIME/DATE DISPLAY

```
 1-01-01     MON A00
12:00:  A  02
```

CLOCK SET

```
      〔CLOCK SET〕
 1-01-01   MON
12:00:  A

      〔OPTIONS〕
OSD TYPE:      FULL
TIME ADJUST:   SLAVE
```

TIMER DISPLAY

```
〔1〕 12:00A ➡ 12:00A  02
〔2〕 12:00A ➡ 12:00A  02
〔3〕 12:00A ➡ 12:00A  02
〔4〕 12:00A ➡ 12:00A  02
〔5〕 12:00A ➡ 12:00A  02
〔6〕 12:00A ➡ 12:00A  02
〔7〕 12:00A ➡ 12:00A  02
MON:✻,✻ TUE:✻,✻ WED:✻,✻
THU:✻,✻ FRI:✻,✻ SAT:✻,✻
        SUN:✻,✻
```

SELECTION MENU Ⅰ

```
    〔SELECTION MENU〕
REC MODE:       NORMAL
SEARCH SPEED:   X5
ONE SHOT REC:   6FIELDS
VIDEO INPUT:    COMPOSITE
PLAY MODE:      AUTO
TIME DATE CODE:1
BAUD RATE:      1200BAUD
CAMERA SW:      12~
```

SELECTION MENU Ⅱ

```
     〔SELECTION MENU〕
     BUZZER SELECTION
 TAPE END:         OFF
 TROUBLE:          OFF
 NO VIDEO:         OFF
 AUTO REC CHECK:  OFF
 ALARM OUT:        OFF
```

ALARM DISPLAY

```
      〔ALARM SET〕
DURATION:       MANUAL
SPEED:          02
ALARM READY:    YES
ALARM OUT:      DURATION

  〔RECYCLE FUNCTIONS〕
  REWIND,STOP IF ALARM
```

ALARM MEMORY DISPLAY

```
   〔ALARM MEMORY〕 A00

1
2
3
4
5
6
7
8
9
```

Initial Program Function Display Formats

Note: If the VCR is not turned on for about 720 hours after the built-in battery is fully charged (after the VCR is turned on for more than 48 hours), the TIME/DATE display will be cleared.

ESTABLISHING THE PROGRAM MODE

The TIME/DATE display appears on the monitor screen when the power cord is first plugged in.

SELECTING A FUNCTION TO BE PROGRAMMED

The program menu will always begin with the CLOCK SET function, followed by the TIMER, SELECTION MENU Ⅰ, SELECTION MENU Ⅱ, ALARM, and then the ALARM MEMORY functions. Although the program menu always follows this order, it is possible to skip any of the available functions during the selection process.

To select the desired program function (and to move from one program function to the next), press the PROGRAM button repeatedly until the desired function display format appears on the monitor.

After the desired function has been selected, follow the corresponding procedure to set that function.

SETTING THE PROGRAM FUNCTION(S)

The first step in each programming procedure is: "Press the START/STOP button". The system allows up to five minutes for any one function setting to be completed after the START/STOP button is pushed. If no change/setting is entered within the five minutes period, the unit will automatically exit the selected program function. (If this happens, reselect the desired program function, and follow the programming procedure for that function.)

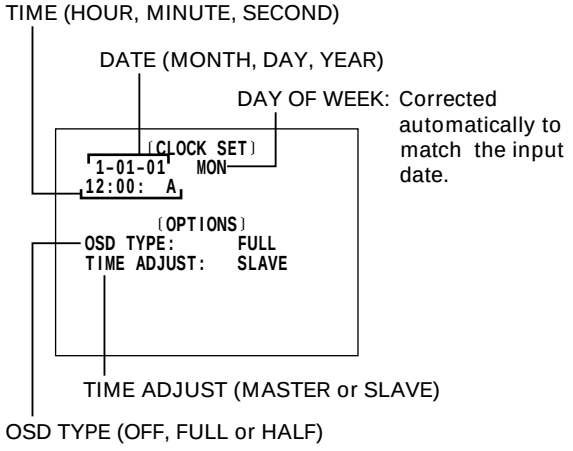
The following procedures for setting VCR functions assume that the desired function has already been selected.

Notes:

1. During programming, holding the SET, UP, or DOWN button will move/change the displayed information at a rapid rate.
2. The position of the TIME/DATE display on the monitor can be adjusted by using the H-POS and V-POS button on the front panel.

SETTING THE TIME AND DATE

Use the CLOCK SET display to set the date and time.



CLOCK SET Display Format Description

1. Press the START/STOP button so that [CLOCK SET] flashes on/off.
2. Press the SET button. The month flashes on/off.
3. Press the UP or DOWN button until the desired number appears on the monitor.
4. Press the SET button. The day flashes on/off.
5. Press the UP or DOWN button until the desired number appears on the monitor.
6. Press the SET button. The year flashes on/off.
7. Press the UP or DOWN button until the desired number appears on the monitor.
8. Press the SET button. The hour flashes on/off.
9. Press the UP or DOWN button until the desired number appears on the monitor.
   Remember to watch the AM/PM indicator when setting the hours.
10. Press the SET button. The minutes flash on/off.
11. Press the UP or DOWN button until the desired number appears on the monitor.
12. Press the START/STOP button: the seconds will start counting and the clock will start. [CLOCK SET] will flash on/off again at this time.
13. To display the time/date you have set here on the monitor screen, press the START/STOP button again to cause [OPTIONS] to flash, and then proceed with step 2 in item on OSD TYPE on page 17.
14. Press the START/STOP button three times.
    - Make sure that letters [CLOCK SET] or [OPTIONS] are not flashing.

Notes:

- Perform the same procedure as when setting the time and date to make corrections after having set them. The minutes flash on/off when the SET button is pressed (in step 2 above).
- To record time and date on the tape, display them on the monitor screen. If they are not displayed on the monitor, they cannot be recorded on the tape.

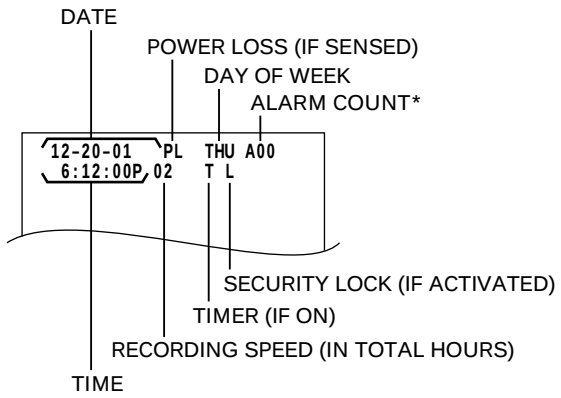
SETUP (Continued)

SETTING [OPTIONS] ITEMS

OSD TYPE: The TIME/DATE display was not designed to appear at the factory. If you wish to record the time/date together with image, perform the following procedure:

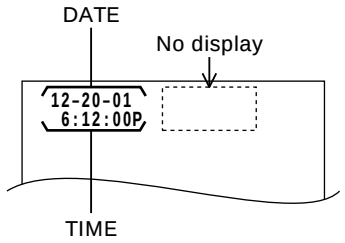
There are two types of TIME/DATE display: FULL and HALF.

FULL

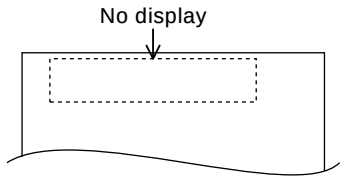


* The ALARM Count Number records alarms from 0 to 99 and then resets to 0 and continues counting.

HALF



OFF



1. Press the START/STOP button twice so that [OPTIONS] flashes on/off.
2. Press the SET button so that the OSD TYPE: setting flashes on/off.
3. Press the UP or DOWN button to select the setting (OFF, FULL or HALF).
4. Press the START/STOP button again. The selected setting will light.

Note: The position of the TIME/DATE display on the monitor can be adjusted by using the H-POS and V-POS button on the front panel.

TIME ADJUST: When two or more of this VCR model are connected to pins ⑧ TIME ADJUST of each EXTERNAL INTERFACE jack, the clocks in both VCRs can automatically be set to the same time (TIME ADJUST function).

To use the TIME ADJUST function, set one VCR to MASTER and any others to SLAVE.

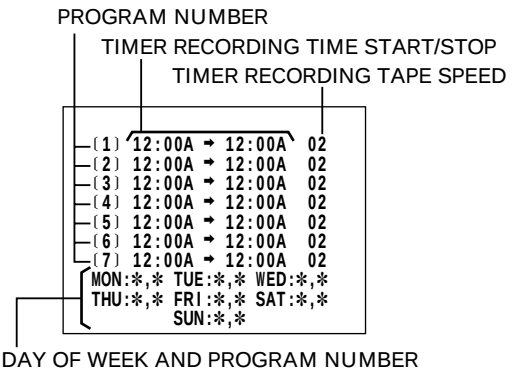
1. Press the START/STOP button twice so that [OPTIONS] flashes on/off.
2. Press the SET button twice so that the TIME ADJUST: setting flashes on/off.
3. Press the UP or DOWN button to select the setting (SLAVE or MASTER).
4. Press the START/STOP button again. The selected setting will light.

Notes:

- You can set OSD TYPE and TIME ADJUST after you have set the date and time.
- The TIME ADJUST function operates only when the VCRs are turned on. Therefore, turn the VCRs on around 2:00:05. This function will not operate if the times on the MASTER and SLAVE VCRs drift by more than one hour and 30 minutes.

SETTING THE TIMER

To set the 24 Hour On/Off Timer function.


PROGRAM NUMBER
TIMER RECORDING TIME START/STOP
TIMER RECORDING TAPE SPEED
(1) 12:00A → 12:00A 02
(2) 12:00A → 12:00A 02
(3) 12:00A → 12:00A 02
(4) 12:00A → 12:00A 02
(5) 12:00A → 12:00A 02
(6) 12:00A → 12:00A 02
(7) 12:00A → 12:00A 02
MON:✻,✻ TUE:✻,✻ WED:✻,✻
THU:✻,✻ FRI:✻,✻ SAT:✻,✻
SUN:✻,✻
DAY OF WEEK AND PROGRAM NUMBER

1 :TIMER will record for the time set for PROGRAM NUMBER 1
2 :TIMER will record for the time set for PROGRAM NUMBER 2
3 :TIMER will record for the time set for PROGRAM NUMBER 3
4 :TIMER will record for the time set for PROGRAM NUMBER 4
5 :TIMER will record for the time set for PROGRAM NUMBER 5
6 :TIMER will record for the time set for PROGRAM NUMBER 6
7 :TIMER will record for the time set for PROGRAM NUMBER 7
✻ :No recording

TIMER Display Format Description

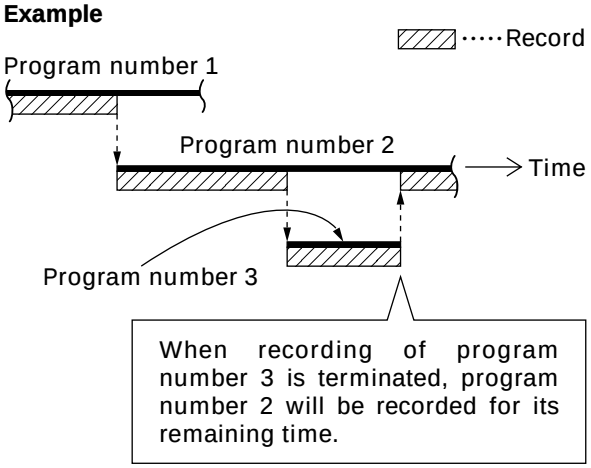
1. Press the START/STOP button.
   The program number (1) flashes on/off.
2. Press the SET button. The start hours flash on/off.
3. Press the UP or DOWN button until the desired number appears on the monitor.
   Remember to watch the AM/PM indicator when setting the hours.
4. Press the SET button. The start minutes flash on/off.
5. Press the UP or DOWN button until the desired number appears on the monitor.
6. Press the SET button. The stop hours flash on/off.
7. Repeat steps 3 through 5 to set the stop hours and minutes. Remember to watch the AM/PM indicator when setting the hours.
8. Press the SET button. The timer recording speed flashes on/off.
9. Press the UP or DOWN button until the desired number appears on the monitor.
10. Press the SET button after setting the timer recording speed. The program number of the next lower line flashes on/off.
11. Repeat steps 2 through 9 to set the program to the other program numbers.
12. Press the SET button after setting the program numbers (1) through (7).
    The two program event locations of MON flash on/off.
13. Press the SET button. The first program event location of MON flashes.
14. Press the UP or DOWN button until the desired program number appears on the monitor.
15. Press the SET button. The other program event location of MON flashes on/off.
16. Press the UP or DOWN button until the desired program number appears on the monitor.
    Notes:
    - If you do not need to timer record two events a day, mark either event with an asterisk (✻).
    - If two asterisks are displayed, no timer recording is made on that day.
17. After setting two program event locations of MON, press the SET button. The two program event locations of the next day of the week flashes on/off.
18. Press the SET button. The first program event location of the next day flashes.
19. Repeat steps 12 through 16 to set the program event locations up to SUN.
20. Press the START/STOP button when the TIMER has been set.

SETUP (Continued)

Notes:

1. Programming the TIMER function does not activate it. See TIMER recording, page 24.
2. To record the time and date press the PROGRAM button to display them.
3. When the preset START time is later than the STOP time, the recording will be made into the following day.
4. When the START time and STOP time are the same, a recording will not be made.
5. When the programs for timer recording overlap each other, recording will be switched to the program with the later recording start time.

Example


·····Record
Program number 1
Program number 2
Time
Program number 3
When recording of program number 3 is terminated, program number 2 will be recorded for its remaining time.

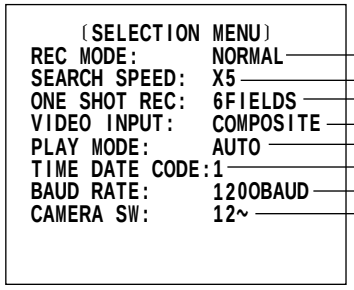
6. When two programs have the same start time, the program number with the longest stop time has priority.

■ **To correct information**

1. Press the START/STOP button.
2. Press the UP or DOWN button repeatedly until the item to be corrected (Program number or program event location of day of the week) flashes on/off.
3. When the section to be corrected flashes on/off, press the SET button.
   - Press the SET button again so that only the digit to be corrected flashes on/off.
4. Press the UP or DOWN button to correct the set information.
5. After completing the correction, press the START/STOP button.

SETTING THE VCR FUNCTIONS

The SELECTION MENU Ⅰ screen allows you to select the VCR operations and functions to match the applications.



REC MODE (NORMAL or HD)
- "HD" appears in the display in the HD mode.

SEARCH SPEED (3, 5, 7 or 9 times the normal speed)
- You can select the visual search speed.

ONE SHOT REC (2, 4, 6, 8 FIELD)
- You can select the number of fields to be recorded during one shot recording.

Note: If time/date recording (TIME DATE CODE) 1-4 is selected, the mode for one-shot recording (number of fields) cannot be changed. To change the mode for one-shot recording, set the time/date recording to "OFF".

VIDEO INPUT (Composite or Y/C)
- You can select between the video signals at the VIDEO IN and Y/C VIDEO IN jacks.

PLAY MODE (AUTO or VHS)
- Specify "VHS" when playing back an S-VHS tape on which a VHS standard signal is recorded.

TIME DATE CODE (time/date recording)
- 1: Time/date recording is made with code 1.
- 2: Time/date recording is made with code 2.
- 3: Time/date recording is made with code 3.
- 4: Time/date recording is made with code 4.
- OFF: No time/date recording is made.

Information:
With code 1, the date/time signal is written to the 19H of video signal.
With code 2, the date/time signal is written to the 22H of video signal.
With code 3, the date/time signal is written to the 12H of video signal.
With code 4, the date/time signal is written to the 33H of video signal.
If code 2 or 4 is selected, noise may appear across the top of playback picture.
With OFF specified, no date/time signal is written.

BAUD RATE (1200, 2400, 4800, 9600 BAUD)
- You can select the transmission speed with the personal computer.

CAMERA SW
- You can select the timing with which pulses are output to switch the camera.
- 12~ (✻18~): The pulses are output during recording at 12 (or 18) or a longer speed in the NORMAL (or HD) mode.
  ALL: The pulses are output during recording in all modes.
  02 (✻06) ONLY: The pulses are output during recording at the 02 (or 06) speed in the NORMAL (or HD) mode.

SELECTION MENU Ⅰ Format Description

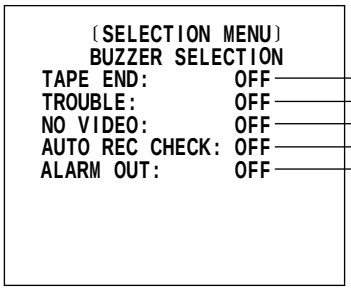
1. Press the START/STOP button.
   The REC MODE option "HD" flashes on/off.
2. Press the SET button repeatedly until the item the setting of which you want to change flashes.
3. Press the UP or DOWN button to select the value or setting you want.
4. After selecting, press the START/STOP button.

SETUP (Continued)

SETTING THE BUZZER

This VCR has a buzzer function.
Use SELECTION MENU Ⅱ to select the times when you wish buzzer to sound.

Note: "OFF" is specified for all buzzer options at the factory.



TAPE END (ON or OFF)
- To specify whether buzzer turns on or off, synchronized with pin ④ TAPE END OUT of the EXTERNAL INTERFACE jack.
  ON: Buzzer will keep sounding when tape reaches the end during recording.
  OFF: Buzzer will not sound even when tape reaches the end.

TROUBLE (ON or OFF)
- To specify whether buzzer turns on or off when abnormality occurs in this VCR.
  ON: Buzzer will keep sounding if abnormality occurs.
  OFF: Buzzer will not sound even if abnormality occurs.

NO VIDEO (ON or OFF)
- To specify whether buzzer turns on or off when no video signal is input during recording.
  ON: Buzzer will keep sounding when video signal input stops.
  OFF: Buzzer will not sound even when input stops.

AUTO REC CHECK (ON or OFF)
- To specify whether buzzer turns on or off if recording is abnormal after the AUTO REC CHECK function.
  ON: Buzzer will keep sounding if recording is abnormal.
  OFF: Buzzer will not sound even if recording is abnormal.

ALARM OUT (ON or OFF)
- To specify whether buzzer turns on or off when alarm is output.
  ON: Buzzer will keep sounding if alarm is output.
  OFF: Buzzer will not sound even if alarm is output.

SELECTION MENU Ⅱ Format Description

1. Press the START/STOP button.
   The TAPE END option "OFF" flashes on/off.
2. Press the SET button repeatedly until the item the setting of which you want to change flashes.
3. Press the UP or DOWN button to select the value or setting you want.
4. After selecting, press the START/STOP button.

To stop buzzer:

1. When TAPE END lights in the VCR display, press the EJECT button: The tape will come out and the buzzer will stop.
2. When "A" lights in the VCR display and also "NO VIDEO" appears on the monitor screen, the buzzer will stop when video signal is input.
3. When "REC CHECK" appears on the monitor screen, press the STOP button: The buzzer will stop.
4. When alarm indicator ALARM flashes in the VCR display, press the ALARM RESET button: The buzzer will stop.
5. If buzzer function varies in any of the above cases, the VCR may be abnormal. Press the RESET buttons simultaneously: The buzzer will stop. However, note carefully that all settings will return to initial values set at the factory.

Note: You can also stop buzzer by switching ON to OFF in SELECTION MENU Ⅱ.

SETTING THE ALARM

The ALARM function allows the user to set the recording duration, speed to be recorded and tape recycle for alarm recordings. When a contact closure occurs at the ALARM IN input, the VCR automatically enters the RECORD mode at the pre-programmed ALARM recording speed. (See Alarm In, page 11 for a complete description of the ALARM sequence.) The ALARM recording duration can last according to the set value, or until the contact closure is reopened.

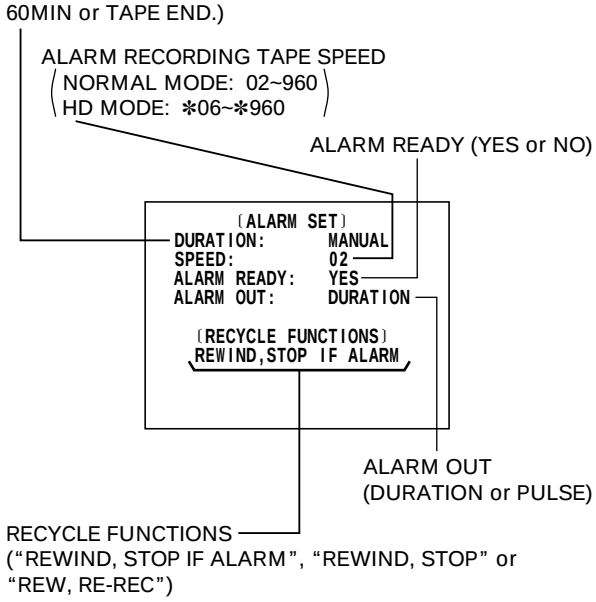
The ALARM recording speed can be pre-programmed to 02~960 in the NORMAL mode or to ✻06~✻960 in the HD mode.

The checking signal is automatically recorded on the tape at the beginning of each ALARM recording. Later, you can easily locate the start of each recording by using these signals when watching a recorded content. See "ALARM INDEX SEARCH" on page 26 for details.

The TIME/DATE display is set as follows during ALARM display.

— ALARM stars (✻) will replace the colons (:).

— The recording speed will be changed to 02~960 (or ✻06~✻960) in the NORMAL (or HD) mode which was selected from the "SPEED" setting in the ALARM display.


DURATION: User programmable length or time the unit stays in the alarm record mode. (MANUAL, 5 SEC, 15 SEC, 30 SEC, 1 MIN, 3 MIN, 5 MIN, 10 MIN, 30 MIN, 60MIN or TAPE END.)
ALARM RECORDING TAPE SPEED
NORMAL MODE: 02~960
HD MODE: ✻06~✻960
ALARM READY (YES or NO)
〔ALARM SET〕
DURATION: MANUAL
SPEED: 02
ALARM READY: YES
ALARM OUT: DURATION
〔RECYCLE FUNCTIONS〕
REWIND,STOP IF ALARM
ALARM OUT
(DURATION or PULSE)
RECYCLE FUNCTIONS
("REWIND, STOP IF ALARM", "REWIND, STOP" or "REW, RE-REC")

ALARM Display Format Description

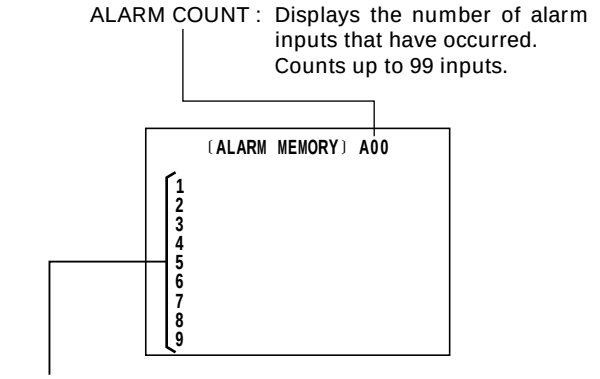
Notes:

- When the ALARM recording ends, the unit will return to the original record speed and restore the original record speed values to the TIME/DATE displays.
- Select 02 (or ✻06) from the "SPEED" setting in the NORMAL (or HD) mode when the alarm input is within 30 seconds. If the 12~960 (✻18~✻960) speed is selected, electronic "marks" are not recorded on the tape and alarm index search will not operate.

1. Press the START/STOP button. The duration setting flashes on/off.
2. Press the UP or DOWN button until the desired setting appears on the monitor. (MANUAL, 5, 15, 30 SEC, 1, 3, 5, 10, 30, 60 MIN, TAPE END)
3. Press the SET button. The record speed setting flashes on/off.
4. Press the UP or DOWN button until the desired setting appears on the monitor.
   (NORMAL MODE: 02~960h
   HD MODE: ✻06~✻960h)
5. Press the SET button. The alarm ready setting flashes on/off.
6. Press the UP or DOWN button to select the alarm ready function. (YES or NO)
   Select "YES" if you want to start alarm recording even in the normal record or stop mode.
   Select "NO" if you do not want alarm recording in the stop mode.
7. Press the SET button. The alarm out setting flashes on/off.
8. Press the UP or DOWN button to select the alarm out function. See "ALARM OUT" on page 11 for details. (DURATION or PULSE)
9. Press the SET button.
   The RECYCLE position flashes on/off.
10. Press the UP or DOWN button to select the mode at the end of tape. See "TAPE RECYCLE" on page 24 for details.
11. Press the START/STOP button.
    Programming for the ALARM has been completed.

ALARM MEMORY RECALL AND RESET

The VCR signals that an alarm has occurred by flashing the ALARM indicator. If a power loss has occurred, a "PL" will appear in the first line of the Full type TIME/DATE display.



ALARM MEMORY:
1: Displays the date/time of the first alarm recording.
2~9: Displays the 8 dates/times of the last alarms to have occurred including the last alarm recording.

ALARM MEMORY Display Format Description

To recall the ALARM display:

1. Press the PROGRAM button until the ALARM MEMORY display appears on the monitor.
2. Log the time/date information from the ALARM memory.

To reset the ALARM memory:

- When the ALARM RESET button is pressed once, if "PL" is flashing, "PL" will disappear. Press the button again to clear the ALARM memory.
- When "PL" is not flashing, press the ALARM RESET button once to clear the ALARM memory.

TAPE RECORDING

CAUTION: Recording over existing recorded material will completely erase that material. To prevent accidental recording over the end of a previous recording, advance the tape several seconds before beginning the next recording.

Note: The VCR detects whether S-VHS or VHS tape has been inserted automatically and records in the S-VHS or VHS mode.

1. Insert a video cassette; be sure the cassette safety tab is intact, or the tab slot is covered.
2. Press the REC/PLAY HOURS button until the desired tape speed is observed on the tape speed indicator.
3. Press the RECORD button to start recording.
4. Press the STOP button to stop recording.

Notes:

— The tape speed mode can be changed during recording.

— AUDIO can be recorded at the 02, 12 and 24 (✻06, ✻18 and ✻30) tape speeds in the NORMAL (HD) mode.

— "NO VIDEO" will be displayed when no video signal input during recording.

This VCR offers three special recording functions, ONE SHOT recording, TIMER recording and ALARM recording.

REC CHECK

This function allows you to check whether the pictures are being recorded normally or not during recording.

When the PLAY button is pressed during recording, the recorded picture is played in the still mode for several seconds. After the still picture appears on the monitor twice, recording will continue.

AUTO REC CHECK

If tape reaches the end during recording, this function allows the VCR to automatically rewind the tape and play it back for several seconds. If AUTO REC CHECK detects from playback that the tape has been normally recorded, the VCR will rewind the tape to its start. If AUTO REC CHECK detects that the tape has not been normally recorded, "REC CHECK" will appear at the top left of the monitor screen.

Note: If "AUTO REC CHECK: ON" is specified in SELECTION MENU Ⅱ, the buzzer will keep sounding when tape has not been normally recorded.

ONE SHOT RECORDING

In the ONE SHOT mode, when the ONE SHOT IN contacts are closed, it triggers recording for 2, 4, 6 or 8 fields at 2.2 (6.67) fields per second in the NORMAL (HD) mode.

Use the SELECTION MENU Ⅰ to specify "TIME DATE CODE: OFF".

If the next signal is not received in approx. 3 minutes, the VCR will automatically record 2, 4, 6 or 8 fields. This process will be repeated approx. every 3 minutes.

To record in this mode; follow the TAPE RECORDING procedure, steps 1 through 3, setting the tape speed mode at 00.

You can select the number of fields to be recorded in the ONE SHOT REC mode using the SELECTION MENU Ⅰ screen.

Note: ONE SHOT recording is not possible when "TIME DATE CODE: 1, 2, 3 or 4" is specified in the SELECTION MENU Ⅰ display.

TIMER RECORDING

This VCR can also record at any speed on TIMER command (turn on/off to record during any 24-hour time period). To program the TIMER function, refer to pages 18 and 19.

To operate the TIMER recording function; follow the TAPE RECORDING procedure, step 1, then press the TIMER button to activate the programmed TIMER function.

Notes:

— Pressing the TIMER button is not accepted during playback.

— If a start time for timer recording is reached during normal recording, timer recording is started. After the timer recording finishes, the previous normal recording mode is restored.

TAPE RECYCLE

The "RECYCLE FUNCTIONS" in the ALARM (or RECYCLE FUNCTIONS) display determine the mode after recording at the end of tape.

When the "REWIND, STOP IF ALARM" is selected:

— If no alarm has been received during the recorded period, the VCR automatically rewinds to the beginning of tape and continues recording.

— If an alarm has been received via the ALARM IN terminal during the recording period, the VCR automatically rewinds to the beginning of tape and then enters the STOP mode.

When "REWIND, STOP" is selected:

— When the tape reaches the end during recording, the VCR automatically rewinds to the beginning of tape and enters the STOP mode.

When "REW, RE-REC" is selected:

— When the tape reaches the end during recording, the VCR automatically rewinds to the beginning of tape and continues recording.

Note: When "REWIND, STOP" or "REW, RE-REC" is selected, the VCR operates whether an alarm has occurred or not.

OPERATION (Continued)

Recycle	Alarms Present on Recorded Tape	Results
REWIND, STOP IF ALARM	YES	Rewinds tape, then stops. Will not respond to alarm input.
	NO	Rewinds tape then continues to record.
REWIND, STOP	YES	Rewinds tape, then stops. Will not respond to alarm input.
	NO	Rewinds tape, then stops. Will not respond to alarm input.
REW, RE-REC	YES	Rewinds tape then continues to record.
	NO	Rewinds tape then continues to record.

ALARM RECORDING

This VCR can automatically record at one of twelve speeds 02~960 (✻06~✻960) when an alarm command is given in the NORMAL (HD) mode.
To program the ALARM function refer to page 22. The remote/contact switch must be connected to the VCR. See page 11.
To operate the ALARM recording in the stop mode: follow the tape recording procedure, step 1, then select "YES" of the ALARM READY menu in the ALARM display.

MASTER SYSTEM RESET

Press the two reset buttons simultaneously to provide a MASTER SYSTEM RESET. Use to reset abnormal displays and operations. The programmable features must be re-programmed.

PLAYBACK

1. Rewind the tape to the desired beginning point. (Press the REWIND button, and observe the digital counter until the desired number appears.) Press the stop button.
2. Press the REC/PLAY HOURS button until the desired tape speed is observed on the tape speed indicator.
3. Press the PLAY button to initiate forward playback.
   To select reverse playback; press the PLAY button and then press the REVERSE PLAY button.
   Forward playback resumes when the PLAY button is pressed.

Notes:

- When the REVERSE PLAY button is pressed in the forward playback mode to set the VCR to the reverse playback mode, the first several frame images may be distorted.
- When the REVERSE PLAY button is pressed during playback at the A12, A24, 24 or 48 (A18, A30, 30 or 48) hour speed, reverse play is performed automatically at the 72 hour speed.
- The VCR will automatically enter the STOP mode if the reverse play is continued for approx. 1 minute.

4. Press the STOP button to stop playback.

Notes:

— The tape speed mode can be changed during playback.
— When a picture recorded in the 02 mode is played back in the A12 or A24 mode, it includes noise. It is recommended that you play back pictures recorded in the 02 mode at modes higher than 24.
— When the tape reaches the end, the unit automatically rewinds to the beginning of the tape and then goes to the STOP mode.
— If the monitor display exhibits distortion in the upper part of the picture, adjust the horizontal hold control on the monitor.
— Adjust the SLOW TRACKING control to minimize noise when playing back at slow speed (more than 24 hours in the NORMAL mode or more than 30 hours in the HD mode).
— The playback picture is not stable and has some noise at A12 or A24 (A18 or A30) mode. And in these modes TRACKING control is not effective.

STILL PLAYBACK

When the STILL button is pressed during playback, a still picture can be seen. To start again press STILL or PLAY button and the VCR will continue playback.

Notes:

- When still playback continues for more than 5 minutes, the AUTO-PROTECT circuit operates and the VCR will enter the STOP mode automatically.
- If the picture shakes up and down during still playback, adjust the V.LOCK control.

V.LOCK ADJUST

If the picture shakes up and down during still playback, adjust the picture by the following procedure.

1. Play back a tape, recorded in the 02 (06) mode, in the still playback mode.
   - With some monitors, if the V.LOCK control is adjusted when playing a tape recorded in modes other than 02 (06), shaking of the still picture may not stop.
2. Adjust the V.LOCK control so the shaking of the picture stops.

Note: Shaking of the picture may not be stopped completely depending on the monitor used.

PLAYBACK IN THE FIELD FORWARD/REVERSE MODES

When you press the FIELD FORWARD or FIELD REVERSE button during still playback mode, one field at a time can be seen.

Operates only after STILL button has been pressed.

Notes:

- An AUTO-PROTECT circuit automatically returns the unit to the STOP mode if the STILL or PLAY button is not pressed again or if FIELD FORWARD or FIELD REVERSE button is not pressed in any five minute period.
- When the FIELD REVERSE button is pressed in the still playback mode to set the VCR to the field reverse mode, the first several frame images may be distorted.

VISUAL SEARCH (High Speed Scan)

Note: The visual search function allows the recorded material to be reviewed at 3, 5, 7 or 9 times the normal 2 (or 6) hours speed in the NORMAL (or HD) mode.

1. Press the PLAY button.
2. Press the SEARCH (F.FWD) button to select the VISUAL SEARCH FORWARD mode, or press the SEARCH (REWIND) button to select the VISUAL SEARCH REVERSE mode.
3. Press the PLAY button again to resume normal playback.

Notes:

- The visual search speed can be changed using the SELECTION MENU Ⅰ screen.
- The playback picture will have some noise in the visual search mode.

ALARM INDEX SEARCH

The alarm index search method causes electronic "marks" to be recorded on the tape at each point when the ALARM recording begins.

Later, the VCR can find these "marks" automatically, making it easy to find the beginning of each alarm for playback.

These check points are permanent until the tape is erased. A check mark is recorded automatically each time the VCR starts ALARM recording.

1. Press the PLAY button to start playback.
2. Press the ALARM INDEX button.
3. Press the REW or F.FWD button. The recorder enters VISUAL SEARCH mode.
4. When the VCR finds a mark, it enters normal playback mode.
5. Press REW or F.FWD button again to find next "marked" recording. The recorder advances tape to the next marked position.
6. Press the ALARM INDEX button again to release alarm index search.

Notes:

1. Be careful as no alarm input can be detected for 5 seconds immediately after the visual search mode is entered by pressing the REW or F.FWD button during the alarm index search mode.
2. When tapes recorded by other VCRs are played in the alarm index search mode, the VCR may enter the play mode in a meaningless position.
3. When you have selected "MANUAL" at the DURATION setting in the ALARM display, and the duration of an alarm recording is shorter than the values shown below, "marks" may not be detected.

   SPEED (NORMAL MODE)
   02 .....15 seconds
   12, 24 .....1 minute
   48, 72 .....3 minutes
   120 .....5 minutes
   168, 240 .....10 minutes
   360, 480, 600, 720, 960 ...30 minutes
   SPEED (HD MODE)
   06 .....15 seconds
   18, 30, 48, 72 .....1 minute
   120, 168, 240 .....3 minutes
   360 .....5 minutes
   480, 600, 720, 960 .....10 minutes

TO SECURE THE VCR

This feature restricts unauthorized use, tampering, or accidental changes in the operation of the VCR. The security feature does not operate during programming. Simultaneously press the SET and DOWN buttons in the program set area of the front panel. The security message "L" appears in the TIME/DATE display (FULL) and the LOCK indicator lights in the VCR's display.

To release the security feature, press the SET and DOWN buttons simultaneously.

Note: "L" does not appear in the TIME/DATE display (HALF).

TIME DATE SEARCH

If "TIME DATE CODE: 1, 2, 3 or 4" is specified in the SELECTION MENU Ⅰ display and a recording is made, recording data (date and time) is written on the tape.

Enter the date and time of the scene you want to view when playing back a tape recorded in the TIME DATE SEARCH mode; the VCR searches for the required scene. When the VCR locates the scene for which you input the date and time, it plays back the scene in the still play mode.

WARNING: If "REWIND, STOP IF ALARM" is selected, at the end of the tape VCR will rewind and re-record.

Recording in the TIME DATE SEARCH mode

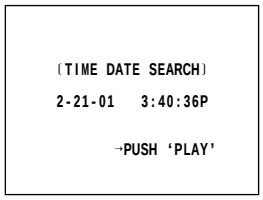
1. Set the date and time correctly.
2. Insert a cassette into the VCR.
3. Press the REC/PLAY HOURS buttons to select the tape speed.
4. Press the RECORD button to start recording.
5. Press the stop button to stop recording.

Notes:

- ONE SHOT recording (00 hour) is not possible in the TIME DATE SEARCH mode.
- If date/time recording is made when combined with a connection device, such as a multiplexer, normal playback picture may not appear, depending on the connection device. In this case, change "TIME DATE CODE:" to "2, 3 or 4" (see page 20), and make another recording to ensure that normal playback picture appears with the selected option. (If "2 or 4" is selected, noise may appear across the top of playback picture). If normal picture still does not appear, select "OFF".
  - — One-shot recording (see page 24) is not possible when "TIME DATE CODE:" is specified from "1–4".
  - — If "TIME DATE CODE:" is changed from "OFF" to "1–4" when the 00 recording mode (one-shot recording) is selected for ordinary recording or timer recording, recording will be made in the 48-hour mode.
  - — If you do not want time/date recording, specify "TIME DATE CODE: OFF".
  - — Time/date recording is not possible unless the date/time has been set.

Playback using the TIME DATE SEARCH function:

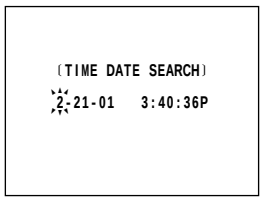
1. Insert a cassette recorded in the TIME DATE SEARCH mode.
2. Press the TIME DATE SEARCH button.
   "CASSETTE CHECKING" will flash on the monitor screen.
   When checking is finished and the words "CASSETTE CHECKING" disappear, proceed with the following steps.
   The screen for entering the date/time to be searched will appear.



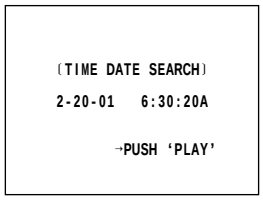
Screen for entering the date/time to be searched

- The screen displays the date/time when the inserted cassette was recorded. The above screen shows that this cassette was recorded around 3:40:36 p.m. on February 21.

3. Press the START/STOP button.
   The month will flash and the words on the following line will disappear.



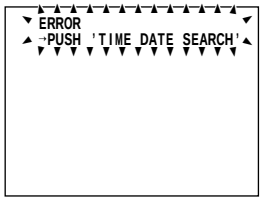
4. Enter the recorded date and time of the scene you want to view.
   - Press the UP and DOWN buttons to enter the required numerals.
   - Press the SET button to shift to the next digit.
   - After entering the seconds, press the START/STOP button.



5. Press the PLAY button.
   The VCR collates the date/time data you have entered and the recording data on tape and starts rewinding or fast forwarding.
   The TIME DATE SEARCH function will operate and "TIME DATE SEARCH" will flash on the monitor screen.
6. When the VCR locates the scene for which you entered the date and time, it plays the tape in the still play mode automatically.

Notes:

- The TIME DATE SEARCH function also operates with cassettes recorded by another VCR of the same model.
- The function may not operate with cassettes on which the tape speed was switched frequently or recording dates were skipped.
- If the VCR cannot find the recording data written on the tape which has been recorded in the TIME DATE SEARCH mode or cannot find the data you have entered even after the TIME DATE SEARCH operation has continued for approx. 10 minutes, it will stop automatically and "ERROR" will flash.



- Select the "TIME DATE CODE:" you have set for the time/date recording. If the code is different from that specified "TIME DATE CODE:", time date search will not be possible.
  If time/date recording is made with "TIME DATE CODE: 1" specified, time date search will be possible even with "TIME DATE CODE: OFF".

OPERATING THE VCR FROM A PERSONAL COMPUTER

Connect this VCR to a personal computer via the RS-232C interface jacks to remote control the VCR by operating the computer. You can also display the status of the VCR on the monitor screen to check it.

■ RS-232C Interface Specifications

Communication system: Full duplex

Communication rate: 1200/2400/4800/9600 BAUD (The rate can be specified using the SELECTION MENU Ⅰ screen. This is set to 1200 BAUD at the factory.)

Communication format:
- Start: 1 bit
- Data: 8 bits
- Parity: None
- Stop: 1 bit

Communication codes: Two types, the ASCII and display character codes

ASCII code

The codes with diagonal line are not used.

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0			S_X	E_X												
1																
2	(blank)	!									✻		,	–		
3	0	1	2	3	4	5	6	7	8	9	:		<		>	?
4		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5	P	Q	R	S	T	U	V	W	X	Y	Z					
6																
7																

Display character code

The codes with diagonal line are not used.

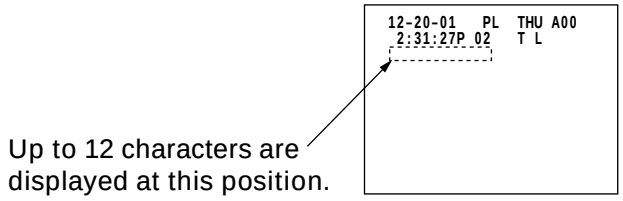
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0																
1																
2	(blank)		“		$	%	&	‘	(	)	✻	+	,	–	.	/
3	0	1	2	3	4	5	6	7	8	9	:	;		=		?
4		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5	P	Q	R	S	T	U	V	W	X	Y	Z					
6		a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7	p	q	r	s	t	u	v	w	x	y	z					

■ Communication Protocol

1. Be sure to attach an “SX” code at the start of communications and an “EX” code at the end. The VCR does not accept the command without these codes.
2. The VCR only transmits a reply to the received command.
3. When the VCR receives one of the remote control commands shown on page 30, it returns the status for reception acknowledgment or the status requested currently.
4. If the commands are transmitted consecutively or another command is transmitted before the VCR has ended an operation, the VCR returns the “SX”BUSY”EX” code. Re-transmit the command.
5. If there is a mistake in the received communications format, the VCR returns one of the following communication error codes.
   - ERL: Error in code length
   - ERC: Error in code format
   - ERT: Error inside the VCR (when return is not possible within about 2 seconds)
6. When the VCR detects a communications error such as a stop bit error, bit length error, etc., it replaces the received byte with “!” for processing.
   ✻ If a communications error occurs in the OSD display data, the OSD character is replaced with “!”. If a communications error occurs in data other than the above, a communications error code is returned.

■ OSD Display Data

When the date and hour are displayed or nothing is displayed (only the picture is displayed), up to 12 characters are displayed at the position shown in the figure.



■ Format of Commands and Status

See pages 31 and 32 for the meanings of the small letters in the table.

	Function of command	Format of command	Status for reception acknowledgment
Remote operation	Stop	$^{s}_{x}$STO$^{E}_{x}$	$^{s}_{x}$STO$^{E}_{x}$
	Fast forward	$^{s}_{x}$FWD$^{E}_{x}$	$^{s}_{x}$FWD$^{E}_{x}$
	Rewind	$^{s}_{x}$REW$^{E}_{x}$	$^{s}_{x}$REW$^{E}_{x}$ Operates the VCR in the same
	Recording	$^{s}_{x}$REC$^{E}_{x}$	$^{s}_{x}$REC$^{E}_{x}$ way as when its buttons
	Playback	$^{s}_{x}$FPL$^{E}_{x}$	$^{s}_{x}$FPL$^{E}_{x}$ are pressed.
	Reverse play	$^{s}_{x}$RPL$^{E}_{x}$	$^{s}_{x}$RPL$^{E}_{x}$
	Frame advance	$^{s}_{x}$FAD$^{E}_{x}$	$^{s}_{x}$FAD$^{E}_{x}$
	Reverse frame advance	$^{s}_{x}$RAD$^{E}_{x}$	$^{s}_{x}$RAD$^{E}_{x}$
	Pause/still play	$^{s}_{x}$PAU$^{E}_{x}$	$^{s}_{x}$PAU$^{E}_{x}$
	Pause/still play ON	$^{s}_{x}$PA1$^{E}_{x}$	$^{s}_{x}$PA1$^{E}_{x}$
	Pause/still play OFF	$^{s}_{x}$PA0$^{E}_{x}$	$^{s}_{x}$PA0$^{E}_{x}$
	Tape eject	$^{s}_{x}$EJE$^{E}_{x}$	$^{s}_{x}$EJE$^{E}_{x}$
	One shot input	$^{s}_{x}$OSR$^{E}_{x}$	$^{s}_{x}$OSR$^{E}_{x}$ Controls pin ③.
	Alarm index ON/OFF	$^{s}_{x}$AIw$^{E}_{x}$	$^{s}_{x}$AIw$^{E}_{x}$
	Timer ON/OFF	$^{s}_{x}$TSs$^{E}_{x}$	$^{s}_{x}$TSs$^{E}_{x}$ Operates the VCR in the same
	Mode lock ON/OFF	$^{s}_{x}$MLI$^{E}_{x}$	$^{s}_{x}$MLI$^{E}_{x}$ way as when its buttons
	Alarm reset	$^{s}_{x}$AL–$^{E}_{x}$	$^{s}_{x}$AL–$^{E}_{x}$ are pressed.
	Counter reset	$^{s}_{x}$CO–$^{E}_{x}$	$^{s}_{x}$CO–$^{E}_{x}$
	Tape end reset	$^{s}_{x}$TE–$^{E}_{x}$	$^{s}_{x}$TE–$^{E}_{x}$ Controls pin ⑤.
	System control microprocessor reset	$^{s}_{x}$SY–$^{E}_{x}$	
	Tape speed	$^{s}_{x}$SPD r$^{E}_{x}$	$^{s}_{x}$SPD$^{E}_{x}$ Specifies the recording/playback mode.
	TIME ADJUST	$^{s}_{x}$TAη$^{E}_{x}$	$^{s}_{x}$TAη$^{E}_{x}$
	OSD screen number	$^{s}_{x}$SCR n$^{E}_{x}$	$^{s}_{x}$SCR$^{E}_{x}$
	OSD horizontal display position up	$^{s}_{x}$HO>$^{E}_{x}$	$^{s}_{x}$HO>$^{E}_{x}$
	OSD horizontal display position	$^{s}_{x}$HOR jj$^{E}_{x}$	$^{s}_{x}$HOR$^{E}_{x}$
	OSD vertical display position up	$^{s}_{x}$VE>$^{E}_{x}$	$^{s}_{x}$VE>$^{E}_{x}$
	OSD vertical display position	$^{s}_{x}$VER vv$^{E}_{x}$	$^{s}_{x}$VER$^{E}_{x}$
	REC MODE	$^{s}_{x}$RDh$^{E}_{x}$	$^{s}_{x}$RDh$^{E}_{x}$
	ONE SHOT REC	$^{s}_{x}$ORf$^{E}_{x}$	$^{s}_{x}$ORf$^{E}_{x}$
	SEARCH SPEED	$^{s}_{x}$SXx$^{E}_{x}$	$^{s}_{x}$SXx$^{E}_{x}$ Settings on the SELECTION
	VIDEO INPUT	$^{s}_{x}$VIc$^{E}_{x}$	$^{s}_{x}$VIc$^{E}_{x}$ MENU Ⅰ screen.
	PLAY MODE	$^{s}_{x}$PMj$^{E}_{x}$	$^{s}_{x}$PMj$^{E}_{x}$
	TIME DATE CODE	$^{s}_{x}$ATm$^{E}_{x}$	$^{s}_{x}$ATm$^{E}_{x}$
	CAMERA SW	$^{s}_{x}$CSW z$^{E}_{x}$	$^{s}_{x}$CSW$^{E}_{x}$
	Clock setting	$^{s}_{x}$CLK yy-mm-dd, hh:ff, www$^{E}_{x}$	$^{s}_{x}$CLK$^{E}_{x}$ Specifies the current time.
	Buzzer setting	$^{s}_{x}$BZR β, γ, δ, ε, ζ$^{E}_{x}$	$^{s}_{x}$BZR$^{E}_{x}$
	Alarm recording setting	$^{s}_{x}$ALA ddd, r, u, o, qqqq$^{E}_{x}$	$^{s}_{x}$ALA$^{E}_{x}$ Sets the alarm recording conditions.
	Program setting	$^{s}_{x}$PRp hh:ff, hh:ff, r$^{E}_{x}$	$^{s}_{x}$PRp$^{E}_{x}$ Sets a timer program.
	Timer setting	$^{s}_{x}$www p, p$^{E}_{x}$	$^{s}_{x}$www$^{E}_{x}$ Selects the timer program on each day of the week.
	OSD display	$^{s}_{x}$OSD αααααααααααα$^{E}_{x}$	$^{s}_{x}$OSD$^{E}_{x}$ Command to display characters.
	TIME DATE SEARCH setting	$^{s}_{x}$TDS yy-mm-dd, hh:ff:ss$^{E}_{x}$	$^{s}_{x}$TDS$^{E}_{x}$

OPERATING THE VCR FROM A PERSONAL COMPUTER (Continued)

	Function of command	Format of command	Status for reception acknowledgment	
Status check	VCR running status	$^{s}_{x}$VCR ?$^{E}_{x}$	$^{s}_{x}$VCR bbb, s, w, l, v, a$^{E}_{x}$	Status formats
	Tape speed	$^{s}_{x}$SPD ?$^{E}_{x}$	$^{s}_{x}$SPD hr$^{E}_{x}$	
	Cassette status	$^{s}_{x}$CAS ?$^{E}_{x}$	$^{s}_{x}$CAS y, b, ttt$^{E}_{x}$	
	Time	$^{s}_{x}$CLK ?$^{E}_{x}$	$^{s}_{x}$CLK yy-mm-dd, hh:ff:ss, www$^{E}_{x}$	
	Alarm count	$^{s}_{x}$ALC ?$^{E}_{x}$	$^{s}_{x}$ALC aa$^{E}_{x}$	
	Alarm setting information	$^{s}_{x}$ALA ?$^{E}_{x}$	$^{s}_{x}$ALA ddd, r, u, o, qqqq$^{E}_{x}$	
	Alarm memory information	$^{s}_{x}$ALq ?$^{E}_{x}$	$^{s}_{x}$ALq yy-mm-dd, hh:ff:ss$^{E}_{x}$	
	Program setting information	$^{s}_{x}$PRp ?$^{E}_{x}$	$^{s}_{x}$PRp hh:ff, hh:ff, r$^{E}_{x}$	
	Timer setting information	$^{s}_{x}$www ?$^{E}_{x}$	$^{s}_{x}$www p, p$^{E}_{x}$	
	Counter value	$^{s}_{x}$CTR ?$^{E}_{x}$	$^{s}_{x}$CTR ccccc$^{E}_{x}$	
	OSD display picture	$^{s}_{x}$SCR ?$^{E}_{x}$	$^{s}_{x}$SCR n$^{E}_{x}$	
	OSD setting values	$^{s}_{x}$OSD ?$^{E}_{x}$	$^{s}_{x}$OSD jj, vv,d$^{E}_{x}$	
	Various setting values	$^{s}_{x}$SET ?$^{E}_{x}$	$^{s}_{x}$SET x, f, c, j, m, A, 0, z$^{E}_{x}$	
	Buzzer setting value check	$^{s}_{x}$BZR ?$^{E}_{x}$	$^{s}_{x}$BZR β, γ, δ, ε, ζ$^{E}_{x}$	
	TIME ADJUST	$^{s}_{x}$TAD ?$^{E}_{x}$	$^{s}_{x}$TAη$^{E}_{x}$	
	Total time of use	$^{s}_{x}$TOT ?$^{E}_{x}$	$^{s}_{x}$TOT xxxxx, zzzzz$^{E}_{x}$	
	Tape end signal	$^{s}_{x}$END ?$^{E}_{x}$	$^{s}_{x}$END e, g$^{E}_{x}$	

■ **Details of Small Letters**

Symbol	Identification	Type of code	Details of code
α	OSD characters	Display characters	See the display character code table on page 29.
β	TAPE END buzzer	ASCII	1=ON 0=OFF
γ	Trouble buzzer	ASCII	1=ON 0=OFF
δ	NO VIDEO buzzer	ASCII	1=ON 0=OFF
ε	REC CHECK buzzer	ASCII	1=ON 0=OFF
ζ	ALARM OUT buzzer	ASCII	1=ON 0=OFF
η	TIME ADJUST	ASCII	1=MASTER 0=SLAVE
a	Alarm yes/no	ASCII	1: Alarm input, 0: No alarm
aa	Number of alarms	ASCII	2-digit number (00~99 or E0~E9)
b	Safety tab on cassette	ASCII	1: Tab, 0: No tab
bbb	Running status	ASCII	Three letters STO: Stop FPL: Playback REC: Recording STI: Still RAD: Reverse frame advance REW: Rewind FWD: Fast forward REV: Reverse search CUE: Forward search RPL: Reverse play FAD: Frame advance AIS: Alarm index search
c	VIDEO INPUT	ASCII	C: Composite, Y: Y/C
ccccc	Counter value	ASCII	5-digit number (00000~99999)
dd	Day	ASCII	2-digit number (01~31)
ddd	ALARM DURATION	ASCII	Three letters or two numerals and one letter MAN: Manual, 05S: 5 s, 15S: 15 s, 30S: 30 s, 01M: 1 min, 03M: 3 min, 05M: 5 min, 10M: 10 min, 30M: 30 min, 60M: 60 min, END: TAPE END

Symbol	Identification	Type of code	Details of code
e	Tape end output (2)	ASCII	1: high, 0: low
f	ONE SHOT REC	ASCII	2, 4, 6, 8: Number of fields (in recording)
ff	Minute	ASCII	2-digit number (00~59)
g	Tape end output	ASCII	1: high, 0: low
h	REC MODE	ASCII	H: High Density, N: Normal
hh	Hour	ASCII	2-digit number (00~23)
j	PLAY MODE	ASCII	A: Auto, V: VHS
jj	Horizontal display start position	ASCII	2-digit number (03~21)
l	Mode lock	ASCII	1: ON, 0: OFF
m	TIME DATE CODE	ASCII	A: OFF, T: 1
mm	Month	ASCII	2-digit number (01~12)
n	OSD screen	ASCII	one numeral (0~7) 0: Various data display (FULL) 1: Various data display (HALF) 2: Timer programming 3: Mode selection 4: Alarm record setting or recycle functions 5: Alarm memory 6: Display off 7: Head usage time A: Buzzer setting screen B: Time setting screen
o	ALARM OUT	ASCII	D: Duration, P: Pulse
p	Timer program number	ASCII	One-digit number (1~7) or *
q	Alarm memory number	ASCII	One-digit number (1~9)
qqqq	RECYCLE FUNC.	ASCII	4 letters ALRM: REWIND, STOP IF ALARM RWND: REWIND, STOP RREC: REW, RE-REC
r	Tape speed	ASCII	One numeral or one letter (0~9, A, B, C, E) 0: 02 or 06, 1: A12 or A18, 2: A24 or A30, 3: 24 or 30, 4: 48, 5: 72, 6: 120, 7: 168, 8: 240, 9: 360, A: 480, B: 600, C: 720, D: 960, E: 00
s	Timer standby	ASCII	1: ON, 0: OFF
ss	Second	ASCII	2-digit number (00~59)
ttt	Tape status	ASCII	Three letters NTP: No cassette, END: End of tape, BGN: Start of tape, NRM: Normal status
u	ALARM READY	ASCII	Y: Yes, N: No
v	Power failure yes/no	ASCII	1: Power failure, 0: No power failure
vv	Vertical display start position	ASCII	2-digit number (02~22)
w	Alarm index	ASCII	1: ON, 0: OFF
www	Day of the week	ASCII	Three letters SUN: Sunday, MON: Monday, TUE: Tuesday, WED: Wednesday, THU: Thursday, FRI: Friday, SAT: Saturday
x	SEARCH SPEED	ASCII	3, 5, 7, 9: Search speed ratio
xxxxx	Head usage time	ASCII	5-digit number (00000~99999)
y	Type of cassette	ASCII	N: Normal, S: S-VHS
yy	Year	ASCII	2-digit number (00~99)
z	CAMERA SW	ASCII	2: 02 or 06, 0: 12~ or 18~, 1: ALL
zzzzz	Total time of use	ASCII	5-digit number (00000~99999)

PROBLEM GUIDE

If you are having this kind of trouble:	Check these things:
■ No power (No indicators ON)	□ Check to see if unit is plugged in. (Power at supply outlet?)
■ Recorder fails to respond to user command/ operation	□ Perform MASTER SYSTEM RESET. See page 25.
■ No monitor picture	□ Carefully check monitor/VCR/camera connectors. □ Check whether the composite or Y/C (S) video has been selected from the SELECTION MENU Ⅰ.
■ Poor picture during monitor viewing (in the RECORD or STOP mode)	□ Check monitor/camera adjustments.
■ Black streaks in picture during 02, A12 or A24 (06, A18 or A30) playback in the NORMAL (HD) mode	□ Adjust the TRACKING control (may need to be returned to center position if previously adjusted). The TRACKING control is only active at the 02, A12 or A24 (06, A18 or A30) speed in the NORMAL (HD) mode. □ Replace cassette. □ Clean video heads.
■ Recording or playback cannot be done	□ Remove cassette and reinsert. □ Check the LOCK indicator on the front panel. If the indicator is lit, press both SET and DOWN buttons simultaneously to release the security lock.
■ RECORD functions not operable	□ Check the TAB indicator is lit (Cassette without its safety tab). □ See Note on page 13.
■ PLAY function not operable	□ Be sure there is a cassette in the unit.
■ Extreme noise appears on the playback picture	□ Video heads require cleaning.
■ TIME/DATE information not displayed on the MONITOR	□ Select FULL or HALF with OSD TYPE in [OPTIONS]. See page 17.
■ TIMER recording was not done	□ TIMER may not have been set properly. □ Check for SAFETY TAB of cassette. □ TIME and DATE are not correct. □ Cassette tape length may have been exceeded. Multiple ALARMs used up tape.
■ REWIND or FAST FORWARD does not operate	□ Tape may already be rewound or be at the end of tape.
■ Unable to SELECT/CHANGE program feature	□ Check the LOCK indicator on the front panel. If the indicator is lit, press both SET and DOWN buttons simultaneously to release the security lock.
■ The VCR does not operate if an operation button is pressed	□ Press the EJECT button to remove the cassette, then restart VCR operations.
■ Buzzer sounds	□ You have specified the buzzer to sound when abnormality has occurred. See page 21.

SPECIFICATIONS

Video Cassette:	S-VHS or VHS type
Recording:	Rotary Two-Head Helical Scan Azimuth Recording
Tape Speed:	33.4 mm/sec. (02 mode) 11.1 mm/sec. (06 mode)
Tape Width:	12.7 mm
Operation Temperature:	5°C to 40°C
Video:	NTSC color and EIA standard
Recording Lengths:	NORMAL MODE: 02, 12, 24, 48, 72, 120, 168, 240, 360, 480, 600, 720, 960 and ONE SHOT (00 mode) HD MODE: 06, 18, 30, 48, 72, 120, 168, 240, 360, 480, 600, 720, 960 and ONE SHOT (00 mode)
Video Input:	1 Vp-p 75 ohm Unbalanced (BNC)
Video Output:	1 Vp-p 75 ohm Unbalanced (BNC)
Y/C (S) Video Input:	Y+S: 1 Vp-p 75 ohm Unbalanced C: 0.286 Vp-p 75 ohm Unbalanced
Y/C (S) Video Output:	Y+S: 1 Vp-p 75 ohm Unbalanced C: 0.286 Vp-p 75 ohm Unbalanced
S/N Ratio (Video):	More than 42 dB (S-VHS 02 mode) More than 45 dB (VHS 02 mode)
S/N Ratio (Audio):	More than 40 dB (02 mode)
Horizontal Resolution:	Colour: 400 lines (S-VHS) Monochrome: 400 lines (S-VHS) Colour: 240 lines (VHS) Monochrome: 320 lines (VHS)
Audio Input:	–8 dBm 50 kohm Unbalanced
Audio Output:	–9 dBm 600 ohm Unbalanced
Audio Frequency Range:	100 Hz to 8 kHz (02 mode)
Power:	AC 120V, 60 Hz, grounding type 3 prong AC plug
Power Consumption:	22W
Cabinet Size:	435 mm (W) x 94 mm (H) x 366 mm (D)
Weight:	5.5 kg

* Design and specifications are subject to change without notice.

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